

2nd Workshop on Qualifications for Nuclear Decommissioning

Bergen (The Netherlands)

24-28 October 2016

INTRODUCTION

According to its mission, European Human Resources Observatory – in Nuclear (EHRO-N) identified the nuclear sector's major challenges:

- to fill-in the 30% gap between HR demand and supply in decommissioning
- to adapt nuclear E&T system to comply more with labour market demands.

In answer to these challenges, in the nuclear decommissioning sub-sector was developed the ELINDER project (ELINDER-European Learning Initiative in Nuclear Decommissioning and Environmental Remediation).

ELINDER project started with pooling of existing decommissioning courses in the EU. These courses are disciplines oriented and the qualifications addressed are not specified. ELINDER project aims at training system modernization by turning the existing decommissioning courses-disciplines oriented, into a training programme-qualifications oriented.

The process of training system modernization is based on the design of the flexible qualifications (unit based qualifications) or to implement the European Credit system for Vocational Education and Training (ECVET).

In this context, the 2nd Workshop on Qualifications for Nuclear Decommissioning, organized by JRC-G10 and held in Bergen (The Netherlands) from 24th to 28th October 2016 was designed and organized, as part of efforts for ELINDER project development.

The 2nd WS objectives represent steps towards the training modernization in nuclear decommissioning, using ECVET principles:

- designing 6 qualifications-ECVET oriented
- designing training programs (TP)–market oriented starting from flexible qualifications

The 2nd WS objectives' were achieved based on a close collaboration between JRC-G10 and ECVET experts of ECVET Team.

The responsibilities assigned to JRC-G10 were:

- 2nd WS content coordination
- expert's guide development
- provide a classification of occupations, qualifications and jobs in the three phases of the NPP life cycle (new built; operation; decommissioning).

The tasks assigned to ECVET experts (according to the expert contract CT-EX2014D173553-101) have resulted into the following deliverables:

- to provide review, guidance and supervision for a set of 6 qualifications in nuclear decommissioning;

- to support the design of training programs-qualification oriented, using qualifications as input and taking in account ECVET principles.
- Post-Workshop report
- Electronic file with the presentations given

PARTICIPANTS AND WORKFLOW

It is generally accepted that the scientific level of a scientific event is given by the participants. Four types of participants, listed in the Table 1, were involved in the 2nd Workshop: nuclear experts (from nuclear industry, universities, training providers and research), ECVET experts (ECVET Team), JRC staff and organizers.

Table 1: The participants at the 2nd Workshop

Nuclear experts		ECVET experts	JRC-staff	Organizers
Vladimir Slugen	Lyubomir Pyronkov	Thierry Lefeuve	Franck Wastin	Massimo Flore
Marinela Ilieva	Abdesselam Abdelouas	Alexandra Costa Artur	Pierre Kockerols	Cesar CHENEL-RAMOS
Paul Livolsi	Emilia Vassileva		Birgit Christiansen	Mihail CECLAN
			Marcello Barboni	

The nuclear experts were distributed in two working groups. The nuclear experts were responsible for the fulfilment of tasks and the deadlines assigned to them. A group leader has coordinated the work within each group and has acted as main interface with the JRC contact point.

The 2nd Workshop was structured in 7 working sessions of half day each as is emphasized below:

- the first half day was dedicated to nuclear experts training;
- the next 6 working sessions, were focused on the following tasks:
 - group review of the qualifications drafted in the preparatory phase;
 - group preparation of the ECVET input for training programs (TP)-market oriented starting from flexible qualifications.

The 2nd Workshop on Qualifications for Nuclear Decommissioning was designed and organized in 3 phases, as part of efforts for ELINDER project development.

Within the design phase were identified:

- priority qualifications in decommissioning addressed by the 2nd Workshop are listed in the Table 2;
- the need for building ECVET infrastructure (qualification design- ECVET oriented) with the view of turning existing TP-disciplines oriented into TP-market oriented;

In the preparatory phase, based on remote interaction between experts, were completed three tasks:

- Task 1: Draft design of 6 qualifications (ECVET infrastructure for ELINDER project);
- Task 2: Review for ECVET compliance & transversal analysis;
- Task 3: Amendment of the qualifications

During the execution phase, based on direct interaction between experts, were performed other two tasks:

- Task 4: group review of the 6 qualifications;
- Task 5: group preparation of ECVET input for training programs- qualification oriented

CONCLUSIONS

It is relevant to underline the great work done by all the experts involved in the 2nd Workshop. Results are coherent and consistent and will be useful for different stakeholders interested in flexible qualification development as well as training modernization in the nuclear decommissioning sector.

Table 2: Priority qualifications in decommissioning addressed by the 2nd Workshop

Qualification	Jobs covered
3.1.1. Decommissioning Management	3.1.01. Project Manager
	3.1.02. Contractors Manager
	3.1.03. Management System Manager
	3.1.04. Training Manager
	3.1.05. Licensing Manager (for decommissioning)
	3.1.06. Communication and PR Manager
	3.1.07. Financial Manager
	3.1.08. Site Manager
3.7.1. Radioactive Waste Management	3.7.01. Radioactive Waste Manager
	3.7.02. Radioactive Waste Manager- characterisation
	3.7.03. Radioactive Waste Manager- processing
3.3.1. Preparatory work Management	3.3.01. Site Engineer
	3.3.02. Spent Fuel Management Engineer
	3.3.03. Engineering Support Manager
3.9.1. Radiation Protection Expert	3.9.01 Radiation Protection Manager
3.8.1 Management of maintenance in Decommissioning	3.8.01. Maintenance Engineer – Manager
	3.8.02. Maintenance Supervisor
2.3.1. Management of Radioactive Waste &RP	2.4.01 WM&RP Manager

Conclusions highlighted within the 2nd Workshop regarding the implementation of flexible qualifications and training programs-market oriented are:

- 1) All planned tasks and deliverables were achieved at a high standard of quality. The 2nd Workshop was successful and the working method applied (preparatory phase based on remote interaction between experts and single execution phase) proved to be more efficient and economically viable than having multiple executive workshops without preparatory phase.
- 2) Next steps in nuclear ECVET implementation:
 - In 2017 will be organized the 3rd Workshop on designing qualifications of EQF 5 level (in order to demonstrate permeability between VET and higher education (HE) and flexible learning pathway);
 - In 2018 is foreseen a Conference/WS to get feedback from nuclear industry/NRB and other stakeholders on the perceived benefits of the nuclear ECVET effort.
- 3) Structural analysis of qualifications was done in order to comply with an ECVET requirement:
 - the title of unit of learning outcomes (ULOs) should be in line with role/ functions of jobs covered by the given qualification;
 - the structural analysis has led to several unit titles changing.
- 4) Six flexible qualifications are now established. Five qualifications (3.1.1; 3.7.1; 3.3.1; 3.9.1; and 3.8.1) belong to decommissioning and one (2.3.1) belongs to operation (see Table 2):

- through transversal analysis over two groups of three qualifications were identified common ULOs (listed in the Table 3 and 4), corresponding to common competences/LO;
- three types of ULOs were identified: transversal units (TU)-common over three qualifications; bilateral units (BU))-common over two qualifications; single unit (SU))- belonging to one qualification;

Table 3: First group of flexible qualifications in decommissioning and operation

	3.9.1 Radiation Protection Expert	2.3.1 Management of Radioactive Waste &RP	3.7.1 Radioactive Waste Management
U1	Radiation Protection – TU		
U2	Accident and emergency issues – TU		
U3	Team and project management - TU		
U4	Interaction with other nuclear areas/departments – TU		
U5	Evaluation and optimization of individual and collective doses – BU (3.9.1 ; 2.3.1)	Decommissioning management SU (3.7.1)	
U6	Management of health, radiological and environmental risks - BU (3.9.1; 2.3.1)		
U6/7	Radioactive waste management – BU (3.7.1 ; 2.3.1)		

Table 4: Second group of flexible qualifications in decommissioning

	3.1.1 Decommissioning Management	3.3.1 Preparatory work Management	3.8.1 Management of maintenance in Decommissioning
U1	Management of Decommissioning projects - TU		
U2	Safety and security -TU		
U3	Management - SU	Operation, maintenance and engineering - SU	Facility maintenance - SU
U4	Integrated management system in decommissioning - SU	Preparatory work and spent fuel - SU	
U5	Communication and public relation - SU		

- 4) A methodology for designing training programs (TP) based on exit outcomes was developed:
- training program design is not a compulsory part of ECVET implementation, but the training is the way to emphasise ECVET benefits, because training is more visible and understandable;
 - the design sequence of a TP based on exit outcome, was developed within 2nd WS, has two steps:
 - TP-exit outcomes definition;
 - learning modules identification within each ULOs of a given qualification;
- 5) Five ECVET input for TP based on exit outcomes (or TP-qualification oriented) are now established and emphasized in the Table 5 and 6.
- training modules were identified inside each unit of learning outcomes (ULO);
 - three types of modules were defined: transversal modules (TM)-common over three qualifications; bilateral Modules (BM))-common over two qualifications; single module (SU)- belonging to one qualification;

- some modules have very close contents. Transversal modules can be designed after comparison and limited adjustments. Some transversal modules could be appearing for the 6 training programs.
- 6) Quality of assessment is a key aspect to guaranty the quality of qualifications as well as the quality of training programs. Assessment methods and protocols must be transparent and easy to understand. To be in line with ECVET principles, assessment must focus on skills. The last part of the seminar gave opportunity to work on an example and to design a first template. This must be continued and developed.

Table 5: Training modules for qualifications 3.9.1; 2.3.1; 3.7.1

	3.9.1/11M=9TM+2BM	2.3.1/13M=9TM+4BM	3.7.1/12M=9TM+2BM+1SM
U1	Radiation Protection – 3TM (3.9.1;2.3.1; 3.7.1)		
U2	Accident and emergency issues – 2TM (3.9.1;2.3.1; 3.7.1)		
U3	Team and project management – 3TM (3.9.1;2.3.1; 3.7.1)		
U4	Interaction with other nuclear areas/departments – 1TM (3.9.1;2.3.1; 3.7.1)		
U5	Evaluation and optimization of individual and collective doses U5 (3.9.1 ; 2.3.1)- 1BM	Decommissioning management (3.7.1)- 1SM	
U6	Management of health, radiological and environmental risks U6 (3.9.1; 2.3.1)- 1BM		
U6/7	Radioactive waste management – U6/7 (3.7.1 ; 2.3.1) 2BM		

Table 6: Training modules for the qualifications 3.3.1 and 3.8.1

Training modules for the qualif.			
	3.1.1	3.3.1/7M=5TM+2SM	3.8.1/7M=5TM+2BM
U1	Management of Decommissioning projects 2 TM (3.1.1; 3.3.1; 3.8.1)		
U2	Safety and security 3 TM (3.1.1; 3.3.1; 3.8.1)		
U3	Management	Operation, maintenance and engineering support	Facility maintenance
U4	Communication and PR	Preparatory Work and spent fuel	
U5	Integrated management system in decommissioning		

- 7) Nuclearisation is one of the aims of all the work. Units permit to reduce the time to obtain a full qualification by recognition of previous learning and experience. Time of training can also be adapted and/or reduced with the same philosophy, using modules. Some guidelines for using units and modules could be useful to provide for actors in charge of recognition of previous learning/experience and for training providers.
- 8) To move forward the question of the competent body or bodies able to recognise qualifications, units and modules is on the table. Sustainability of all the qualification and training framework on which we worked depend on the trust of each actor give to documents/awards/diploma delivered. In order to identify/define a respected body in charge of the strategic matter of official recognition of qualifications, units and modules in the nuclear sector, we should identify the authority responsible for a given qualification:
- when qualifications are under the responsibility of a Ministry or a national competent body, there is not any possibility of a supra national authority for the recognition of national qualifications. In that case, the way to support recognition is competent bodies of different countries sign a memorandum of understanding describing communalities of qualifications and the procedure of recognition.

- when qualifications are under the responsibility of and awarded by a professional sector or branch, an independent body trusted by every operators is needed for recognition of units and/or qualification (the case of welding sector was emphasised).

METHODOLOGY AND OUTCOMES

Methodology for qualification design

The starting point was to use the nuclear job taxonomy previously established for the nuclear sector. This material gave a list of job profiles grouped in coherent sets making qualifications covering a range of job profiles.

In the nuclear sector we can underline jobs are performed at EQF upper levels 6 to 8. For our work, and after deep discussion, the 6 qualifications are definitely assigned to level 6.

According to ECVET principles, each qualification is structured in units of learning outcomes. The reference document concerning EQF is the "Proposal for a Council Recommendation on the European Qualifications Framework for lifelong learning and repealing the Recommendation of the European Parliament and of the Council of 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning) COM (2016) 383/2" of the 10th June 2016. The document precise the descriptors of learning outcomes in Knowledge, Skills and Responsibility/autonomy. This last item (Responsibility/autonomy) replaces competence. It defines and characterise the levels.

The tasks were divided in 2 phases:

- a preparatory work from June to September was dedicated to provide drafts of qualifications divided in units of learning outcomes including assessment criteria and methods;
- a face-to-face working during the workshop.

On the first step, qualifications were defined in relation with job requirements. The nuclear experts written proposals checked by the ECVET expert to insure qualifications were set up according to ECVET principles. During this phase, ECVET experts identified transversal units supporting *nuclearisation* and flexible pathways.

As a result of qualifications structural check we improved the title of several ULOs, taking in consideration transversal, bilateral and singular units, for a better coherence of the 6 qualifications.

In addition, qualifications were used as input for program trainings structured in modules and a template for assessment of modules was prepared.

Description of the qualifications produced

2.2.1. DECOMMISSIONING MANAGEMENT (3.1.1.)

The present qualification applies to 8 jobs, specified in the Table 2, increasing their extensive scope.

Unit of learning outcomes No. 1: MANAGEMENT OF DECOMMISSIONING PROJECTS / TU(3.1.1; 3.3.1; 3.8.1)	
Autonomy/Responsibility	
Manage complex decommissioning activities, taking responsibility for decision-making in unpredictable work contexts. Take responsibility for managing professional development of individuals and groups under their responsibility.	
Skills	Knowledge
S.1.1. Coordinate planning, scheduling, implementing and monitoring activities and projects	K.1.1. Decommissioning methodology, techniques and strategies
S.1.2. Manage resources involved in the project	K.1.2. Environmental impact of nuclear power;
S.1.3. Monitor implementation of plans and procedures to ensure compliance with project schedules, safety procedures and legislation	K.1.3. Remediation methods;
S.1.4. Perform risk estimation and management and cost control.	K.1.4. Risk estimation and management
S.1.5. Select contractors and establish contracts	K.1.5. Management and workflow of the project
S.1.6. Develop decommissioning project specifications, scopes-of-work, and prepare tender procedures	K.1.6. Information technology
S.1.7. Intervene, analyse, manage and resolve business and technical conflicts between the company and the contractors	K.1.7. Nuclear decommission practices: clean up of radioactivity (remediation) and plant demolition
S.1.8. Develop procedures and obtain permits (licensing for decommissioning)	K.1.8. Radioactivity and nuclear science and engineering
	K.1.9. Management of civil engineering operations
	K.1.10. Decommissioning regulation and licensing: site characterization, dismantlement activities, plans for site remediation, detailed plans for final radiation surveys for release of the site, environmental change.
	K.1.11. Decommissioning funds and financial mechanism
Assessment criteria:	
Coordination of all planning, implementing and monitoring activities and projects;	Develop licensing procedures and decommissioning strategy(s) (immediate/deferred dismantling)
Monitoring on plans and procedures implementation to ensure compliance with project schedules, safety procedures and legislation	
Identify types and sources of radioactive waste;	
Associate hazards and environmental impacts and safety considerations with the Nuclear Fuel Cycle;	
Manage the risks	
Recommended assessment methods:	
Practical test, Development of project, Situational judgment test, face to face examination, practical exercise, grid test with multiple choice.	

Unit of learning outcomes No.2: SAFETY AND SECURITY / TU(3.1.1; 3.3.1; 3.8.1)	
Autonomy/Responsibility	
<p>Manage complex activities of applying safety principles and requirement and safety and security management, taking responsibility for decision-making in unpredictable work contexts. Take responsibility for managing professional development of individuals and groups under their responsibility.</p>	
Skills	Knowledge
<p>S.2.1. Provide training and information about the special procedures as emergency, potential risks on workers' health, nuclear safety and security</p> <p>S.2.2. Analyze and interpret the licensing requirements</p> <p>S.2.3. Identification of safety requirements</p> <p>S.2.4. Apply regulations issued by different authorities</p> <p>S.2.5. Review processes, systems and activities in the facilities</p> <p>S.2.6. Perform appropriate hazard and accident analysis</p> <p>S.2.7. Develop and document the safety function, functional performance requirements and performance criteria</p> <p>S.2.8. Prepare safety basis documents: Conceptual Safety Design Reports, Preliminary Safety Design Reports, Preliminary Documented Safety Analyses, Documented Safety Analyses and Technical Safety Requirements</p> <p>S.2.9. Monitor and control security, safeguard and non-proliferation requirements</p>	<p>K.2.1. National licensing requirements</p> <p>K.2.2. International regulations and standards</p> <p>K.2.3. Radiation protection (ALARA concept, dose commitment to workers and environment, radiation protection methods and tools)</p> <p>K.2.4. Industrial safety</p> <p>K.2.5. Safety culture</p> <p>K.2.6. Waste and transport safety</p> <p>K.2.7. Emergency preparedness</p> <p>K.2.8. Clearance of material and site release</p> <p>K.2.9. Nuclear security, safeguard and non-proliferation</p> <p>K.2.10. Radiological hazard analysis</p> <p>K.2.11. Risk assessment</p> <p>K.2.12. Environmental site remediation</p>
<p>Assessment criteria:</p> <p>Preparation of information about the special procedures as emergency, potential risks on workers' health, nuclear safety and security</p> <p>Apply the regulations issued by different authorities taking into account interdependencies and interfaces</p> <p>Show compliance of licencing documents with the regulations</p> <p>Perform hazard and accident analysis</p> <p>Prepare safety-related documentation, technical reports</p>	
<p>Recommended assessment methods:</p> <p>Practical test, practical exercise, case study, situational judgment test.</p>	

Unit of learning outcomes No. 3: MANAGEMENT / SU(3.1.1)			
Autonomy/Responsibility			
Manage complex decommissioning projects, taking responsibility for decision-making in unpredictable work or study contexts. Take responsibility for managing professional development of individuals and groups under their responsibility.			
Skills		Knowledge	
S.3.1.	Formulate strategic goals and long-term business plans	K.3.1.	Business administration
S.3.2.	Enforce policies, procedures, and productivity standards	K.2.2.	Strategic planning, Organizing and Monitoring
S.3.3.	Plan and Schedule working processes	K.2.3.	Project management
S.3.4.	Manage personnel - capacity to allocate tasks and organize work	K.2.4.	Resource management
S.3.5.	Plan, manage and control the budget	K.2.5.	Team Management
S.3.6.	Manage and control of processes, purchases, documents	K.2.6.	Requirements of integrated management system
S.3.7.	Manage organisational change	K.2.7.	Site organisation and lifecycle
S.3.8.	Promote safety culture and legal work environment	K.2.8.	Document management
S.3.9.	Evaluate information and data	K.2.9.	Advanced computer literate
S.3.10.	Analyze information for management control	K.2.10.	Nuclear regulation and licensing
S.3.11.	Organize supplies and control of subcontractors		
S.3.12.	Operate computers using a variety of software		
S.3.13.	Comply with statutory regulations and organizational safety requirements		
S.3.14.	Define objectives and evaluate outcomes		
S.3.15.	Interface with stakeholders, auditors and subcontractors		
Assessment criteria:			
Precision in analyzing achievements of organization and formulation directives for further development,		Management control based on deduction analysis	
Plan the phases and activities of according to strategic priorities		Clarity of specified requirements, description, goals, monitoring and effectiveness of processes under their responsibility	
Safety culture principles application on site and comply with the regulatory requirements		Taking responsibility for the process of planning and implementing change in organizations Practice diversity, coaching and mentoring, conflict management	
Capability of planning, scheduling and organization of all resources and service		Adopt technological developments and take into account market trends	
Capacities of partnering and teamwork			
Ability of making appropriate decisions			
Recommended assessment methods:			
Practical test, practical exercise, case study, peer review, essay, situational judgment test.			

Unit of learning outcomes No. 4: COMMUNICATION AND PUBLIC RELATIONS/ SU(3.1.1)	
Autonomy/Responsibility	
Manage complex activities of internal communication and PR management, taking responsibility for decision-making in unpredictable work contexts. Take responsibility for managing professional development of individuals and groups under their responsibility.	
Skills	Knowledge
<p>S.4.1. Draft and provide appropriate information to internal and external stakeholders</p> <p>S.4.2. Prepare, organize, evaluate and follow-up the communication plan</p> <p>S.4.3. Promote cooperative relationships with the stakeholders</p> <p>S.4.4. Conduct public speaking</p> <p>S.4.5. Select and apply the appropriate approaches for information dissemination</p> <p>S.4.6. Control information output and handle incoming requests for information</p> <p>S.4.7. Drive corporate strategy and message development</p> <p>S.4.8. Create, test and improve a crisis communication plan</p>	<p>K.4.1. Communication plan content and workflow</p> <p>K.4.2. Communication strategy application</p> <p>K.4.3. Communication methods and techniques</p> <p>K.4.4. Current trends in digital media/social media communication</p> <p>K.4.5. Crisis management</p> <p>K.4.6. Public relations</p> <p>K.4.7. Occupational sociology</p> <p>K.4.8. Journalism, marketing</p>
Assessment criteria:	
<p>Draft appropriate information for stakeholders</p> <p>Prepare, organize, evaluate and follow-up the communication plan</p> <p>Draft press releases</p> <p>Deliver effective public speech</p> <p>Appropriate approaches and channels for information dissemination</p>	<p>Capacity of networking</p> <p>Conduct a crisis communication plan</p>
Recommended assessment methods:	
Practical test, face to face examination, grid test with multiple choice.	

Unit of learning outcomes No. 5: INTEGRATED MANAGEMENT SYSTEM IN DECOMMISSIONING/ SU(3.1.1)	
Autonomy/Responsibility	
Manage complex activities of implementation, development and improvement of IMS, taking responsibility for decision-making in unpredictable work contexts. Take responsibility for managing professional development of individuals and groups under their responsibility.	
Skills	Knowledge
S.5.1. Develop process maps and establish the requirements with regards documentation, instructions, management of interfaces, transfer of responsibilities, and key competences S.5.2. Analyze and report information S.5.3. Monitor business process performance and effectiveness S.5.4. Carry out the assessment of the processes and propose improvements S.5.5. Coordinate personnel, policies and processes S.5.6. Oversee and apply complex regulations and procedures S.5.7. Monitor implementation, assessment and improvement of the MS. S.5.8. Ensure that the activities comply with the requirements specified in the MS S.5.9. Manage organizational changes and their impact on safety S.5.10. Promote safety culture	K.5.1. National legislation on management system and international standards (e.g. ISO, IAEA) K.5.2. Processes design K.5.3. Quality assurance, management system and environmental management K.5.4. Management of human and organisational factors K.5.5. Safety culture K.5.6. ICT literacy
Assessment criteria:	
Plan process indicators and monitor business process performance and effectiveness Ensure compliance with complex regulations and procedures Review process flow, develop process maps Focus on excellence and continuous improvement	Analyze data and report information Defining proposals for improvement of processes based on collected data and their analysis
Recommended assessment methods:	
Practical test, Situational judgment test, face to face examination, grid test with multiple choice.	

2.2.2. RADIOACTIVE WASTE MANAGEMENT (3.7.1)

Unit of learning outcomes No.1: RADIATION PROTECTION/ TU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
Manage complex activities, related to radioactive waste management and radiation protection aspects. Take responsibility for decision-making in routine and/or unpredictable work in relation with radiation protection expert. Take responsibility for managing professional development of individuals in radioactive waste management and radiation protection areas.	
Skills	Knowledge
<p>S.1.1. Develop specific provisions and procedures based on regulatory requirements on radioactive waste management</p> <p>S.1.2. Implement ALARA principle to define optimised radiation protection actions</p> <p>S.1.3. Confirm work permits</p> <p>S.1.4. Optimize the occupational radiation protection programme</p> <p>S.1.5. Define and/or apply principle strategies of a radiation protection programme during various phases of a nuclear installation (design, operation or dismantling).</p> <p>S.1.6. Develop radiation protection procedures and framework in normal and emergency cases</p> <p>S.1.7. Use radiation control and measurement equipment</p> <p>S.1.8. Develop technical specifications and procedures</p> <p>S.1.9. Monitor and maintain a safe working environment</p> <p>S.1.10. Apply appropriate radiation measurements for preliminary sample sorting</p> <p>S.1.11. Identify appropriate shielding for radiation sources</p> <p>S.1.12. Characterise radiation sources and identify appropriate protection strategies</p>	<p>K.1.1. The main types of ionizing radiation and their effects</p> <p>K.1.2. Relevant national and international legislation and guidelines</p> <p>K.1.3. Dose definition, dose types, dose measures, dose constraints and reference levels</p> <p>K.1.4. Radiation monitoring, workplace monitoring and individual monitoring</p> <p>K.1.5. Radiation protection programs</p> <p>K.1.6. ALARA principle and procedures</p> <p>K.1.7. Health surveillance</p> <p>K.1.8. Radiological impacts on the environment</p> <p>K.1.9. Contamination control, decontamination and reduction of sources of radiation</p> <p>K.1.10. Classification of working areas and access control</p> <p>K.1.11. Use of protective equipment such as shielding and protective clothing</p> <p>K.1.12. Storage arrangements for radioactive/contaminated items</p> <p>K.1.13. Emergency planning and emergency preparedness</p>
Assessment criteria:	
Ability in developing procedures and specifications	Sustainability of safety culture principles application
Capabilities in application of the ALARA implementation strategy	Compliance with legislation in radiation protection area
Successful management of emergency situations	Realism of corrective measures evaluation
Effectiveness of implementation of radiation protection programme	
Recommended assessment methods:	
Situational judgement tests	Inteview
Case studies	Written test
	Task solving

Unit of learning outcomes No.2: ACCIDENTS AND EMERGENCY ISSUES / TU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
Assume position and responsibility in emergency situations. Manage tasks prompt and reactive on changing situation in emergency case, distinguish and select the adequate data, stress control in emergency situation. Proper and prompt communication and reporting.	
Skills	Knowledge
S.2.1. Ensure execution of emergency plans S.2.2. Identify and detect emergency or hazards S.2.3. Monitor radiation situation in emergency case S.2.4. Preparing emergency plans S.2.5. Prepare emergency exercises S.2.6. Mitigate the consequences of accidental situation S.2.7. Protect personnel in restricted areas as well as on site S.2.8. Provide correct and prompt information to organisations and public S.2.9. Evaluate radiation situation in emergency case S.2.10. Predict next development of emergency case S.2.11. Rate abnormal situation S.2.12. Implement protective actions for incidental and accidental conditions S.2.13. Participate in accident event analysis S.2.14. Identify root causes S.2.15. Classify events (INES) S.2.16. Implement corrective measures	K.2.1. Emergency preparedness K.2.2. Emergency planning K.2.3. Several accident management K.2.4. Nuclear safety approaches, principles and requirements K.2.5. Relevant national and international legislation and guidelines K.2.6. Health protection K.2.7. Environmental protection K.2.8. Nuclear safety culture and human factor K.2.9. Nuclear facility components and systems K.2.10. Radiation ecology K.2.11. Contamination and decontamination K.2.12. Protective clothing and protective equipment K.2.13. Classification of area and access control K.2.14. International Nuclear Event Scale (INES) K.2.15. Safety assessment requirements
Assessment criteria:	
Ability for emergency planning and realisation of emergency plans	Appropriateness of corrective actions
Ability to make decision in emergency situations	Ability to apply ALARA and safety culture principles
Adequacy of dose measures and use of radiation control equipment	Behaviour in stress situations
Ability to evaluate the abnormal situation	Prompt reporting
Recommended assessment methods:	
Interview	
Situational judgement tests	
Case studies	
Task solving	
Written exam	

Unit of learning outcomes No.3: TEAM AND PROJECT MANAGEMENT/ TU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
<p>Taking responsibility for decision-making in daily operations and emergency situations in order to respect time schedule and costs for decommissioning installation. Take responsibility for managing professional development of individuals and groups under their responsibility. Take responsibility in strategic resource and workforce planning of the department. Manage and lead the team of professionals in radiation protection and waste management area in decommissioning phase.</p>	
Skills	Knowledge
S.3.1. Participate in recruitment process S.3.2. Plan initial and continuing specialised training for employees S.3.3. Allocate tasks and assign personnel S.3.4. Prioritise objectives S.3.5. Develop teamwork S.3.6. Anticipate and manage conflicts S.3.7. Evaluate individual and team performance S.3.8. Perform managerial communication S.3.9. Propose activities for building successful teams S.3.10. Promote individuals S.3.11. Respect and apply national and international legislation S.3.12. Promote safety culture, questioning attitude and rigorous and prudent approach S.3.13. Manage project	K.3.1. Organisation of human resources K.3.2. Social regulation K.3.3. Workforce planning and recruitment process K.3.4. Individual and team performance K.3.5. Managerial communication K.3.6. Team coordination and motivation K.3.7. Resolution of conflict K.3.8. Work planning K.3.9. Training solutions K.3.10. Change management K.3.11. Quality Management K.3.12. Integrated Management System (conformity with ISO) K.3.13. General principles of knowledge management K.3.14. General principles of configuration management K.3.15. Project management K.3.16. Budget, time and cost management K.3.17. Organizational changes from operation to decommissioning
<p>Assessment criteria:</p> <p>Ability to plan, schedule and control daily work activities</p> <p>Pertinence of workforce planning and adequacy of recruitment activities</p> <p>Ability to manage financial resources</p> <p>Proper application of integrated management system</p> <p>Accurate solutions for solving complex problems in unpredictable and emergency situations</p> <p>Ability to apply national and international standards</p>	
<p>Recommended assessment methods:</p> <p>Interview</p> <p>Situational judgement tests</p> <p>Case studies</p> <p>Task solving</p> <p>Written exam</p>	

Unit of learning outcomes No.4: Interaction with other nuclear actors/departments – TU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
Interact with actors/departments involved in radioactive waste management, decommissioning phase of the NPP project. Taking responsibility for establishing and maintaining relationships with other departments, for participating decision-making in daily operations and emergency situations, for communicating the General Management decisions to the radioactive waste management team.	
Skills	Knowledge
<p>S.4.1. Integrate radwaste management strategy into the decommissioning plan</p> <p>S.4.2. Integrate radwaste management strategy into the overall management strategy of the plant</p> <p>S.4.3. Lead performance of complex analyses involving different facility's systems, structures, components and processes</p> <p>S.4.4. Perform proper communication in different areas of waste management</p> <p>S.4.5. Report activities and disseminate information</p> <p>S.4.6. Coordinate actors in waste management activities</p> <p>S.4.7. Share knowledge, information and experiences</p> <p>S.4.8. Analyse and upgrade decommissioning plans</p>	<p>K.4.1. General plant description and basic technical characteristics of nuclear facilities</p> <p>K.4.2. Nuclear fuel cycle</p> <p>K.4.3. Safety systems operation</p> <p>K.4.4. Radioactive waste treatment systems operation</p> <p>K.4.5. Applicable codes, regulations and standards for decommissioning phase</p> <p>K.4.6. Knowledge of plant (site, units') operational history</p> <p>K.4.7. Safety Analysis Report (SAR)</p> <p>K.4.8. Dismantling methods and techniques</p> <p>K.4.9. Key issues of facilities' maintenance, surveillance and inspection. Facility modifications</p> <p>K.4.10. Radiological characterization of the facility</p> <p>K.4.11. Decontamination techniques for equipment and SSCs</p> <p>K.4.12. Waste categorisation</p> <p>K.4.13. Knowledge management</p>
<p>Assessment criteria:</p> <p>Ability to organise and share knowledge, information and experiences</p> <p>Taking in account professional environment and constraints of design, technological systems and processes</p> <p>Compliance with safety standards, legislation and company policy</p> <p>Pertinence of plant key performance indicators</p> <p>Performance and effectiveness of business processes</p> <p>Accuracy of reports</p> <p>Pertinence of decommissioning plans analyse and upgrading</p>	
<p>Recommended assessment methods:</p> <p>Interview</p> <p>Situational judgement tests</p> <p>Case studies</p> <p>Task solving</p> <p>Written exam</p>	

Unit of learning outcomes No.5: DECOMMISSIONING MANAGEMENT / SU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
Perform and manage tasks in decommissioning activities. Take responsibility for selection of proper decommissioning technologies and procedures. Participation in daily decisions for operations and emergency situations. Communication to the general management. Take responsibility for quality and safety of performed works.	
Skills	Knowledge
S.5.1. Participate and/or organize decommissioning activities S.5.2. Organise decommissioning work S.5.3. Prioritise objectives S.5.4. Use the optimal tools and technology in decommissioning S.5.6. Evaluate efficiency of decontamination S.5.7. Monitor waste accumulation and transport	K.5.1. Waste origin and handlings K.5.2. Contamination, decontamination K.5.3. Decontamination technologies and tools K.5.4. Radioecology and environmental remediation K.5.5. Partitioning and compacting K.5.6. Decommissioning procedures K.5.7. Limits for free release K.5.8. Prediction and simulating of activation
Assessment criteria: Ability to evaluate waste activity Performance of decommissioning strategy and program Ability to organize decommissioning works and activities	
Feedback on operational events Pertinence of decommissioning selected tools and techniques	
Recommended assessment methods: Written test, Interview Situational judgement test Problem solving	
Note:	

Unit of learning outcomes No.6: RADIOACTIVE WASTE MANAGEMENT / BU (2.3.1; 3.7.1)	
Autonomy/Responsibility	
Manage complex activities related to radioactive waste management including handling, treatment and storage. Take responsibility for decisions related to technologies, processes, nuclear and industrial safety as well as impact to environment.	
Skills	Knowledge
S.6.1. Evaluate and control the level of contamination and induced activities of radioactive waste S.6.2. Select optimal solution and manage radioactive waste categorisation S.6.3. Manage radioactive waste handling and transport S.6.5 Apply proper criteria for treated waste classification and handling S.6.6. Evaluate and manage collected data about waste characteristics S.6.9. Comply activities with national program in decommissioning S.6.10. Developing waste management program, specifications and procedures S.6.11. Apply appropriate solutions in packaging	K.6.1. Waste characterisation and categorisation K.6.2. Dosimetry K.6.3. Nuclear safety and radiation protection K.6.4. Relevant national and international legislation and guidelines K.6.5. Health protection K.6.6. Environmental protection K.6.7. Nuclear safety culture and human factor K.6.8. Protective clothing and protective equipment K.6.9. Transport, handling and storage of radioactive waste K.6.10. Treatment and long term storage K.6.11. National policy and program in decommissioning K.6.12. Waste conditioning including packaging
Assessment criteria: Characterisation of radioactive waste Handling with radioactive waste Proper use of radiation control equipment Developing specifications and procedures	
Evaluation of radiation protection measures Manipulation with active waste Effective shielding measures	
Recommended assessment methods: Practical exercises Situational judgement tests Lessons learned Case studies Task solving	

2.2.3. PREPARATORY WORK MANAGEMENT (3.3.1)

Unit of learning outcomes No. 1: MANAGEMENT OF DECOMMISSIONING PROJECTS/ TU (3.1.1; 3.3.1; 3.8.1)	
Autonomy/Responsibility	
Manage complex decommissioning activities, taking responsibility for decision-making in unpredictable work contexts. Take responsibility for managing professional development of individuals and groups under their responsibility.	
Skills	Knowledge
<p>S.1.1. Coordinate planning, scheduling, implementing and monitoring activities and projects</p> <p>S.1.2. Manage resources involved in the project</p> <p>S.1.3. Monitor implementation of plans and procedures to ensure compliance with project schedules, safety procedures and legislation</p> <p>S.1.4. Perform risk estimation and management and cost control.</p> <p>S.1.5. Select contractors and establish contracts</p> <p>S.1.6. Develop decommissioning project specifications, scopes-of-work, and prepare tender procedures</p> <p>S.1.7. Intervene, analyse, manage and resolve business and technical conflicts between the company and the contractors</p> <p>S.1.8. Develop procedures and obtain permits (licensing for decommissioning)</p>	<p>K.1.1. Decommissioning methodology, techniques and strategies</p> <p>K.1.2. Environmental impact of nuclear power;</p> <p>K.1.3. Remediation methods;</p> <p>K.1.4. Risk estimation and management</p> <p>K.1.5. Management and workflow of the project</p> <p>K.1.6. Information technology</p> <p>K.1.7. Nuclear decommission practices: clean up of radioactivity (remediation) and plant demolition</p> <p>K.1.8. Radioactivity and nuclear science and engineering</p> <p>K.1.9. Management of civil engineering operations</p> <p>K.1.10. Decommissioning regulation and licensing: site characterization, dismantlement activities, plans for site remediation, detailed plans for final radiation surveys for release of the site, environmental change.</p> <p>K.1.11. Decommissioning funds and financial mechanism</p>
Assessment criteria:	
<p>Coordination of all planning, implementing and monitoring activities and projects;</p> <p>Monitoring on plans and procedures implementation to ensure compliance with project schedules, safety procedures and legislation</p> <p>Identify types and sources of radioactive waste;</p> <p>Associate hazards and environmental impacts and safety considerations with the Nuclear Fuel Cycle;</p> <p>Manage the risks</p>	<p>Develop licensing procedures and decommissioning strategy(s) (immediate/deferred dismantling)</p>
Recommended assessment methods:	
<p>Practical test, Development of project, Situational judgment test, face-to-face examination, practical exercise, grid test with multiple choice.</p>	

Unit of learning outcomes No.2: SAFETY AND SECURITY / TU (3.1.1; 3.3.1; 3.8.1)	
Autonomy/Responsibility	
Manage complex activities of applying safety principles and requirement and safety and security management, taking responsibility for decision-making in unpredictable work contexts. Take responsibility for managing professional development of individuals and groups under their responsibility.	
Skills	Knowledge
<p>S.2.1. Provide training and information about the special procedures as emergency, potential risks on workers' health, nuclear safety and security</p> <p>S.2.2. Analyze and interpret the licensing requirements</p> <p>S.2.3. Identification of safety requirements</p> <p>S.2.4. Apply regulations issued by different authorities</p> <p>S.2.5. Review processes, systems and activities in the facilities</p> <p>S.2.6. Perform appropriate hazard and accident analysis</p> <p>S.2.7. Develop and document the safety function, functional performance requirements and performance criteria</p> <p>S.2.8. Prepare safety basis documents: Conceptual Safety Design Reports, Preliminary Safety Design Reports, Preliminary Documented Safety Analyses, Documented Safety Analyses and Technical Safety Requirements</p> <p>S.2.9. Monitor and control security, safeguard and non-proliferation requirements</p>	<p>K.2.1. National licensing requirements</p> <p>K.2.2. International regulations and standards</p> <p>K.2.3. Radiation protection (ALARA concept, dose commitment to workers and environment, radiation protection methods and tools)</p> <p>K.2.4. Industrial safety</p> <p>K.2.5. Safety culture</p> <p>K.2.6. Waste and transport safety</p> <p>K.2.7. Emergency preparedness</p> <p>K.2.8. Clearance of material and site release</p> <p>K.2.9. Nuclear security, safeguard and non-proliferation</p> <p>K.2.10. Radiological hazard analysis</p> <p>K.2.11. Risk assessment</p> <p>K.2.12. Environmental site remediation</p>
<p>Assessment criteria:</p> <p>Preparation of information about the special procedures as emergency, potential risks on workers' health, nuclear safety and security</p> <p>Apply the regulations issued by different authorities taking into account interdependencies and interfaces</p> <p>Show compliance of licencing documents with the regulations</p> <p>Perform hazard and accident analysis</p> <p>Prepare safety-related documentation, technical reports</p>	

Unit of learning outcomes No. 3: OPERATION, MAINTANANCE AND ENGINEERING SUPPORT / SU (3.3.1)	
Autonomy/Responsibility	
Manage complex tasks of operation, maintenance and engineering support of decommissioning projects, taking responsibility for decision-making in unpredictable work or study contexts. Take responsibility for managing professional development of individuals and groups involved in decommissioning activities.	
Skills	Knowledge
S.3.1. Plan, implement, co-ordinate and monitor operation activities S.3.2. Plan, implement, co-ordinate and monitor maintenance activities S.3.3. Plan, implement, co-ordinate and monitor engineering support activities S.3.4. Provide technical information for operation, activities S.3.5. Provide technical information for maintenance, activities S.3.6. Provide technical information for engineering support activities S.3.7. Draft work instructions related to waste management S.3.8. Understanding of complex regulations and procedures S.3.9. Perform inspection, evaluation and control of works S.3.10. Specify functional requirements S.3.11. Specify design requirements S.3.12. Assess design options S.3.13. Document design modifications S.3.14. Manage equipment delivery S.3.15. Draft technical specification and requirements S.3.16. Use and interpret engineering drawings and documents	K.3.1. Decommissioning methodology K.3.2. Electrical and mechanical installations K.3.3. Radioactive waste treatment systems K.3.4. Process System engineering and design K.3.5. Electrical engineering and design K.3.6. Mechanical engineering and design K.3.7. HVAC engineering and design K.3.8. Fire protection engineering and design K.3.9. Techniques and methodologies of decontamination within scope K.3.10. Engineering principles (i.e. mechanical, electrical, instrumentation and control) K.3.11. Site specific rules and procedures (permit to work, standard operating & maintenance procedures and risk assessment etc.) K.3.12. Equipment and system operating and maintenance instructions K.3.13. Comprehension on technological systems and processes. K.3.14. Documenting of design solutions and design modifications K.3.15. Establish of relevant procedures for management of equipment purchase and delivery.
Assessment criteria: Appropriate planning, implementation, co-ordination and monitoring of engineering activities on the base of available technical information Ability to draft requirements specifications, technical specifications, reports based of understanding of complex regulations and procedures Appropriate evaluation and control of work; performing inspections and report them	Demonstrate comprehensive knowledge on technological systems and processes. Documenting of design solutions and design modifications Establish of relevant procedures for management of equipment purchase and delivery.
Recommended assessment methods: Practical test, quizzes, grid test with multiple choices, how-to examination.	

Unit of learning outcomes No.4: PREPARATORY WORK AND SPENT FUEL / SU (3.3.1)

Autonomy/Responsibility

Manage complex activities, related to nuclear physics and nuclear engineering aspects of decommissioning projects, taking responsibility for decision-making in unpredictable work or study contexts. Take responsibility for managing professional development of individuals and groups depending on their duties.

Skills		Knowledge	
S.4.1.	Planning, implementing, coordinating and monitoring engineering activities	K.4.1.	Nuclear physics fundamentals
S.4.2.	Organize treatment of damaged fuel elements	K.4.2.	Nuclear engineering
S.4.3.	Plan decommissioning site preparation	K.4.3.	Nuclear installation systems and components
S.4.4.	Defining engineering processes	K.4.4.	Nuclear safety (criticality, heat generation, radiolysis)
S.4.5.	Draft technical specifications and working documents related to decommissioning activities and spent fuel management	K.4.5.	Radiation fundamentals
S.4.6.		K.4.6.	Nuclear standards
S.4.7.	Prepare controlled work areas for decommissioning activities and Design Radiation protection barriers	K.4.7.	Decommissioning techniques
S.4.8.	Implement design modifications	K.4.8.	Chemical Engineering and Waste Management
S.4.9.	Identify and analyze radiological incidents	K.4.9.	Radioactive waste handling and storage
S.4.10.	Report technical and regulatory data according to standard operating procedures	K.4.10.	Inspection of spent fuel assemblies and special conditioning of damaged elements
S.4.11.	Apply defense in depth principle in design	K.4.11.	Spent fuel management, including damaged fuel elements
S.4.12.		K.4.12.	Spent fuel transport (preparation of packaging,)
S.4.13.	Organise and monitor storage, handling, packaging and transport of spent fuel		

Assessment criteria:

Interpret engineering drawings and documents
 Define engineering processes
 Ability to plan and monitor engineering activities applying applicable methods
 Planning of decommissioning site preparation

Planning and managing of safe transport and storage of spent fuel

Recommended assessment methods:

Grid test with multiple choices, quizzes, practical exercise, peer review, face to face examination.

2.2.4. RADIATION PROTECTION EXPERT (3.9.1)

Unit of learning outcomes No.1: RADIATION PROTECTION/ TU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
Manage complex activities, related to radioactive waste management and radiation protection aspects. Take responsibility for decision-making in routine and/or unpredictable work in relation with radiation protection expert. Take responsibility for managing professional development of individuals in radioactive waste management and radiation protection areas.	
Skills	Knowledge
S.1.1. Develop specific provisions and procedures based on regulatory requirements on radioactive waste management S.1.2. Implement ALARA principle to define optimised radiation protection actions S.1.3. Confirm work permits S.1.4. Optimize the occupational radiation protection programme S.1.5. Define and/or apply principle strategies of a radiation protection programme during various phases of a nuclear installation (design, operation or dismantling). S.1.6. Develop radiation protection procedures and framework in normal and emergency cases S.1.7. Use radiation control and measurement equipment S.1.8. Develop technical specifications and procedures S.1.9. Monitor and maintain a safe working environment S.1.10. Apply appropriate radiation measurements for preliminary sample sorting S.1.11. Identify appropriate shielding for radiation sources S.1.12. Characterise radiation sources and identify appropriate protection strategies	K.2.1. The main types of ionizing radiation and their effects K.2.2. Relevant national and international legislation and guidelines K.2.3. Dose definition, dose types, dose measures, dose constraints and reference levels K.2.4. Radiation monitoring, workplace monitoring and individual monitoring K.2.5. Radiation protection programs K.2.6. ALARA principle and procedures K.2.7. Health surveillance K.2.8. Radiological impacts on the environment K.2.9. Contamination control, decontamination and reduction of sources of radiation K.2.10. Classification of working areas and access control K.2.11. Use of protective equipment such as shielding and protective clothing K.2.12. Storage arrangements for radioactive/contaminated items K.2.13. Emergency planning and emergency preparedness
Assessment criteria: Ability in developing procedures and specifications Capabilities in application of the ALARA implementation strategy Successful management of emergency situations Effectiveness of implementation of radiation protection programme Sustainability of safety culture principles application Compliance with legislation in radiation protection area Realism of corrective measures evaluation	
Recommended assessment methods: Situational judgement tests Case studies Interview Written test Task solving	

Unit of learning outcomes No.2: ACCIDENTS AND EMERGENCY ISSUES / TU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
Assume position and responsibility in emergency situations. Manage tasks prompt and reactive on changing situation in emergency case, distinguish and select the adequate data, stress control in emergency situation. Proper and prompt communication and reporting.	
Skills	Knowledge
S.2.1. Ensure execution of emergency plans S.2.2. Identify and detect emergency or hazards S.2.3. Monitor radiation situation in emergency case S.2.4. Preparing emergency plans S.2.5. Prepare emergency exercises S.2.6. Mitigate the consequences of accidental situation S.2.7. Protect personnel in restricted areas as well as on site S.2.8. Provide correct and prompt information to organisations and public S.2.9. Evaluate radiation situation in emergency case S.2.10. Predict next development of emergency case S.2.11. Rate abnormal situation S.2.12. Implement protective actions for incidental and accidental conditions S.2.13. Participate in accident event analysis S.2.14. Identify root causes S.2.15. Classify events (INES) S.2.16. Implement corrective measures	K.2.1. Emergency preparedness K.2.2. Emergency planning K.2.3. Several accident management K.2.4. Nuclear safety approaches, principles and requirements K.2.5. Relevant national and international legislation and guidelines K.2.6. Health protection K.2.7. Environmental protection K.2.8. Nuclear safety culture and human factor K.2.9. Nuclear facility components and systems K.2.10. Radiation ecology K.2.11. Contamination and decontamination K.2.12. Protective clothing and protective equipment K.2.13. Classification of area and access control K.2.14. International Nuclear Event Scale (INES) K.2.15. Safety assessment requirements
Assessment criteria: Ability for emergency planning and realisation of emergency plans Ability to make decision in emergency situations Adequacy of dose measures and use of radiation control equipment Ability to evaluate the abnormal situation Appropriateness of corrective actions Ability to apply ALARA and safety culture principles Behaviour in stress situations Prompt reporting	
Recommended assessment methods: Interview Situational judgement tests Case studies Task solving Written exam	

Unit of learning outcomes No.3: TEAM AND PROJECT MANAGEMENT/ TU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
<p>Taking responsibility for decision-making in daily operations and emergency situations in order to respect time schedule and costs for decommissioning installation. Take responsibility for managing professional development of individuals and groups under their responsibility. Take responsibility in strategic resource and workforce planning of the department. Manage and lead the team of professionals in radiation protection and waste management area in decommissioning phase.</p>	
Skills	Knowledge
<p>S.3.1. Participate in recruitment process S.3.2. Plan initial and continuing specialised training for employees S.3.3. Allocate tasks and assign personnel S.3.4. Prioritise objectives S.3.5. Develop teamwork S.3.6. Anticipate and manage conflicts S.3.7. Evaluate individual and team performance S.3.8. Perform managerial communication S.3.9. Propose activities for building successful teams S.3.10. Promote individuals S.3.11. Respect and apply national and international legislation S.3.12. Promote safety culture, questioning attitude and rigorous and prudent approach S.3.13. Manage project</p>	<p>K.3.1. Organisation of human resources K.3.2. Social regulation K.3.3. Workforce planning and recruitment process K.3.4. Individual and team performance K.3.5. Managerial communication K.3.6. Team coordination and motivation K.3.7. Resolution of conflict K.3.8. Work planning K.3.9. Training solutions K.3.10. Change management K.3.11. Quality Management K.3.12. Integrated Management System (conformity with ISO) K.3.13. General principles of knowledge management K.3.14. General principles of configuration management K.3.15. Project management K.3.16. Budget, time and cost management</p> <p>Organizational changes from operation to decommissioning</p>
<p>Assessment criteria:</p> <p>Ability to plan, schedule and control daily work activities Pertinence of workforce planning and adequacy of recruitment activities Ability to manage financial resources Proper application of integrated management system Accurate solutions for solving complex problems in unpredictable and emergency situations Ability to apply national and international standards</p>	
<p>Ability to plan radioactive waste activities in decommissioning project according to strategic priorities Pertinence of corrective actions to anticipate and reduce stress, and increase individual / team efficiency. Appropriateness of managerial communication</p>	
<p>Recommended assessment methods:</p> <p>Interview Situational judgement tests Case studies Task solving Written exam</p>	

Unit of learning outcomes No.4: Interaction with other nuclear actors/departments TU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
Interact with actors/departments involved in radioactive waste management, decommissioning phase of the NPP project. Taking responsibility for establishing and maintaining relationships with other departments, for participating decision-making in daily operations and emergency situations, for communicating the General Management decisions to the radioactive waste management team.	
Skills	Knowledge
<p>S.4.1. Integrate radwaste management strategy into the decommissioning plan</p> <p>S.4.2. Integrate radwaste management strategy into the overall management strategy of the plant</p> <p>S.4.3. Lead performance of complex analyses involving different facility's systems, structures, components and processes</p> <p>S.4.4. Perform proper communication in different areas of waste management</p> <p>S.4.5. Report activities and disseminate information</p> <p>S.4.6. Coordinate actors in waste management activities</p> <p>S.4.7. Share knowledge, information and experiences</p> <p>S.4.8. Analyse and upgrade decommissioning plans</p>	<p>K.4.1. General plant description and basic technical characteristics of nuclear facilities</p> <p>K.4.2. Nuclear fuel cycle</p> <p>K.4.3. Safety systems operation</p> <p>K.4.4. Radioactive waste treatment systems operation</p> <p>K.4.5. Applicable codes, regulations and standards for decommissioning phase</p> <p>K.4.6. Knowledge of plant (site, units') operational history</p> <p>K.4.7. Safety Analysis Report (SAR)</p> <p>K.4.8. Dismantling methods and techniques</p> <p>K.4.9. Key issues of facilities' maintenance, surveillance and inspection. Facility modifications</p> <p>K.4.10. Radiological characterization of the facility</p> <p>K.4.11. Decontamination techniques for equipment and SSCs</p> <p>K.4.12. Waste categorisation</p> <p>K.4.13. Knowledge management</p>
<p>Assessment criteria:</p> <p>Ability to organise and share knowledge, information and experiences</p> <p>Taking in account professional environment and constraints of design, technological systems and processes</p> <p>Compliance with safety standards, legislation and company policy</p> <p>Pertinence of plant key performance indicators</p> <p>Performance and effectiveness of business processes</p> <p>Accuracy of reports</p> <p>Pertinence of decommissioning plans analyse and upgrading</p>	
<p>Recommended assessment methods:</p> <p>Interview</p> <p>Situational judgement tests</p> <p>Case studies</p> <p>Task solving</p> <p>Written exam</p>	

Unit of learning outcomes No.5: EVALUATION AND OPTIMISATION OF INDIVIDUAL AND COLLECTIVE DOSES / BU (3.9.1; 2.3.1)	
Autonomy/Responsibility	
<p>Manage complex activities concerning evaluation of individual and collective exposures (internal and external). Take responsibility for radiation protection actions implemented with respect to ALARA principle, regulation and rules. Advice other teams on radiation protection issues concerning decommissioning project.</p>	
Skills	Knowledge
<p>S.5.1. Monitor decommissioned areas S.5.2. Evaluate dose rates and radioactive contamination S.5.3. Evaluate the radiation situation S.5.4. Evaluate problems regarding radiation protection and dosimetry S.5.5. Ensure the maintenance of radiation protection instruments and materials S.5.6. Optimise radiation protection methods and techniques for decommissioning S.5.7. Provide information about radiological situation S.5.8. Analyse historical radiologic data of the dismantling installation S.5.9. Analyse and upgrade decommissioning plans S.5.10. Comply with legal requirements of radiation protection and dosimetry in national regulations and rules S.5.11. Recommend personal and collective protective equipment</p>	<p>K.5.1. Measurement of radioactive characteristics K.5.2. Detectors for radiation monitoring K.5.3. Dosimetry (limits and norms) K.5.4. Radiation protection measures and technics K.5.5. Statistical assessment of data K.5.6. Modelling and simulation codes applied in dosimetry K.5.7. ALARA principles K.5.8. Nuclid vectors identification K.5.9. Stochastic approach in radiation impact K.5.10. Biological impacts of radiation doses</p>
<p>Assessment criteria:</p> <p>Ability to manage operational dosimetry data (cartography, computer modelling...).</p> <p>Ability to determine supervised and controlled areas.</p> <p>Pertinence of identification, quantification, and assessment of ionising radiations source term in decommissioned installation.</p>	
<p>Recommended assessment methods:</p> <p>Interview</p> <p>Situational judgement tests</p> <p>Case studies</p> <p>Task solving</p> <p>Written exam</p>	

Unit of learning outcomes No.6: Management of health, radiological and environmental risks BU (3.9.1; 2.3.1)	
Autonomy/Responsibility	
Perform and manage complex tasks to ensure compliance with national and international regulations and standards concerning management of health, radiological and environmental risks. Take responsibility for actions related to health in relation with medical service, radiological and environmental risks.	
Skills	Knowledge
S.6.1. Evaluate health and radiological risks	K.6.1. Risks assessment and management
S.6.2. Evaluate environmental risks	K.6.2. Health and environmental standards, codes and guidelines
S.6.3. Apply risks assessment methods in decommissioning	K.6.3. Biological acceptance of irradiation
S.6.4. Provide internal information about risks assessment	K.6.4. Health protection
S.6.5. Undertake corrective measures	K.6.5. Environmental protection
S.6.6. Harmonise health and regulatory requirements	K.6.6. Radiation protection measures and technics
S.6.7. Propose and implement corrective and preventive actions related to radiological and/or conventional risks	K.6.7. Human behaviour related to health, radiological, and environmental risks
S.6.8. Inform and/or train work teams to global approach "Health Safety Environment"	K.6.8. Individual and collective protective equipment
S.6.9. Participate in workplace studies with related health, safety and medical department	K.6.9. Management of health, radiological, and environmental data
S.6.10. Create and use of health, radiological, and environmental databases	K.6.10. Train the trainers methodology
Assessment criteria:	
Ability to identify, quantify, assess and implement actions for safety hazards and risks	Pertinence of individual and collective protective measures
Effective reporting to the company management related to health, radiological and environmental risks	Pertinence of data management
Ability to lead measures and procedures on health effects and risk assessment and management methods for nuclear installation in decommissioning.	Efficiency of training
Recommended assessment methods:	
Interview	
Situational judgement tests	
Case studies	
Task solving	
Written exam	

2.2.5. MANAGEMENT OF MAINTENANCE IN DECOMMISSIONING (3.8.1.)

Unit of learning outcomes No. 1: MANAGEMENT OF DECOMMISSIONING PROJECTS/ TU (3.1.1; 3.3.1; 3.8.1)	
Autonomy/Responsibility	
Manage complex decommissioning activities, taking responsibility for decision-making in unpredictable work contexts. Take responsibility for managing professional development of individuals and groups under their responsibility.	
Skills	Knowledge
<p>S.1.1. Coordinate planning, scheduling, implementing and monitoring activities and projects</p> <p>S.1.2. Manage resources involved in the project</p> <p>S.1.3. Monitor implementation of plans and procedures to ensure compliance with project schedules, safety procedures and legislation</p> <p>S.1.4. Perform risk estimation and management and cost control.</p> <p>S.1.5. Select contractors and establish contracts</p> <p>S.1.6. Develop decommissioning project specifications, scopes-of-work, and prepare tender procedures</p> <p>S.1.7. Intervene, analyse, manage and resolve business and technical conflicts between the company and the contractors</p> <p>S.1.8. Develop procedures and obtain permits (licensing for decommissioning)</p>	<p>K.1.1. Decommissioning methodology, techniques and strategies</p> <p>K.1.2. Environmental impact of nuclear power;</p> <p>K.1.3. Remediation methods;</p> <p>K.1.4. Risk estimation and management</p> <p>K.1.5. Management and workflow of the project</p> <p>K.1.6. Information technology</p> <p>K.1.7. Nuclear decommission practices: clean up of radioactivity (remediation) and plant demolition</p> <p>K.1.8. Radioactivity and nuclear science and engineering</p> <p>K.1.9. Management of civil engineering operations</p> <p>K.1.10. Decommissioning regulation and licensing: site characterization, dismantlement activities, plans for site remediation, detailed plans for final radiation surveys for release of the site, environmental change.</p> <p>K.1.11. Decommissioning funds and financial mechanism</p>
Assessment criteria:	
<p>Coordination of all planning, implementing and monitoring activities and projects;</p> <p>Monitoring on plans and procedures implementation to ensure compliance with project schedules, safety procedures and legislation</p> <p>Identify types and sources of radioactive waste;</p> <p>Associate hazards and environmental impacts and safety considerations with the Nuclear Fuel Cycle;</p> <p>Manage the risks</p>	<p>Develop licensing procedures and decommissioning strategy(s) (immediate/deferred dismantling)</p>
Recommended assessment methods:	
<p>Practical test, Development of project, Situational judgment test, face to face examination, practical exercise, grid test with multiple choice.</p>	

Unit of learning outcomes No.2: SAFETY AND SECURITY / TU (3.1.1; 3.3.1; 3.8.1)	
Autonomy/Responsibility	
<p>Manage complex activities of applying safety principles and requirement and safety and security management, taking responsibility for decision-making in unpredictable work contexts. Take responsibility for managing professional development of individuals and groups under their responsibility.</p>	
Skills	Knowledge
<p>K.2.1. Provide training and information about the special procedures as emergency, potential risks on workers' health, nuclear safety and security</p> <p>K.2.2. Analyze and interpret the licensing requirements</p> <p>K.2.3. Identification of safety requirements</p> <p>K.2.4. Apply regulations issued by different authorities</p> <p>K.2.5. Review processes, systems and activities in the facilities</p> <p>K.2.6. Perform appropriate hazard and accident analysis</p> <p>K.2.7. Develop and document the safety function, functional performance requirements and performance criteria</p> <p>K.2.8. Prepare safety basis documents: Conceptual Safety Design Reports, Preliminary Safety Design Reports, Preliminary Documented Safety Analyses, Documented Safety Analyses and Technical Safety Requirements</p> <p>K.2.9. Monitor and control security, safeguard and non-proliferation requirements</p>	<p>K.2.1. National licensing requirements</p> <p>K.2.2. International regulations and standards</p> <p>K.2.3. Radiation protection (ALARA concept, dose commitment to workers and environment, radiation protection methods and tools)</p> <p>K.2.4. Industrial safety</p> <p>K.2.5. Safety culture</p> <p>K.2.6. Waste and transport safety</p> <p>K.2.7. Emergency preparedness</p> <p>K.2.8. Clearance of material and site release</p> <p>K.2.9. Nuclear security, safeguard and non-proliferation</p> <p>K.2.10. Radiological hazard analysis</p> <p>K.2.11. Risk assessment</p> <p>K.2.12. Environmental site remediation</p>
<p>Assessment criteria:</p> <p>Preparation of information about the special procedures as emergency, potential risks on workers' health, nuclear safety and security</p> <p>Apply the regulations issued by different authorities taking into account interdependencies and interfaces</p> <p>Show compliance of licencing documents with the regulations</p> <p>Perform hazard and accident analysis</p> <p>Prepare safety-related documentation, technical reports</p>	
<p>Recommended assessment methods:</p> <p>Practical test, practical exercise, case study, situational judgment test.</p>	

Unit of learning outcomes No.3: FACILITY MAINTENANCE/ SU (3.8.1)	
Autonomy/Responsibility	
Manage complex activities and projects, related to maintenance of specific nuclear facilities during decommissioning phase, taking responsibility for decision-making in unpredictable work or study contexts. Take responsibility for managing professional development of individuals and groups depending on their duties.	
Skills	Knowledge
S.3.1. Select the maintenance strategy(s) S.3.2. Select the maintenance technique(s) S.3.3. Design the maintenance program S.3.4. Search for new equipment and technology S.3.5. Conducting regular site visits to ensure optimal maintenance performance S.3.6. Oversee the installation, repair and maintenance of structures, systems and components S.3.7. Manage hazardous chemical and radioactive wastes	K.3.1. Plant systems including machines, mechanical systems, electrical systems, buildings and structures K.3.2. Mechanical and electrical maintenance K.3.3. Radioactive materials and waste fundamentals – characterization, processing, disposal, transportation K.3.4. Maintenance strategies: i.e.: reactive (RM), preventive (PM), predictive (PdM), proactive centered maintenance (PCM) K.3.5. Maintenance techniques: i.e.: condition monitoring (CM), reliability centered maintenance (RCM), Failure Modes & Effects Analysis (FMEA), Failure Modes, Effects, and Criticality Analyses (FMECA), Root Cause Failure Analysis (RCFA), Computerized Maintenance Management System (CMMS), Taxonomy
Assessment criteria:	
Design of maintenance strategies Apply maintenance techniques Supervision of maintenance work	Understanding of specific maintenance approaches, methods and techniques.
Recommended assessment methods:	
Grid test with multiple choices, in-video quizzes, practical exercise, peer review.	

2.2.6. MANAGEMENT OF RADIOACTIVE WASTE & RP (2.3.1)

Unit of learning outcomes No.1: RADIATION PROTECTION/ TU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
Manage complex activities, related to radioactive waste management and radiation protection aspects. Take responsibility for decision-making in routine and/or unpredictable work in relation with radiation protection expert. Take responsibility for managing professional development of individuals in radioactive waste management and radiation protection areas.	
Skills	Knowledge
S.1.1. Develop specific provisions and procedures based on regulatory requirements on radioactive waste management	K.1.1. The main types of ionizing radiation and their effects
S.1.2. Implement ALARA principle to define optimised radiation protection actions	K.1.2. Relevant national and international legislation and guidelines
S.1.3. Confirm work permits	K.1.3. Dose definition, dose types, dose measures, dose constraints and reference levels
S.1.4. Optimize the occupational radiation protection programme	K.1.4. Radiation monitoring, workplace monitoring and individual monitoring
S.1.5. Define and/or apply principle strategies of a radiation protection programme during various phases of a nuclear installation (design, operation or dismantling).	K.1.5. Radiation protection programs
S.1.6. Develop radiation protection procedures and framework in normal and emergency cases	K.1.6. ALARA principle and procedures
S.1.7. Use radiation control and measurement equipment	K.1.7. Health surveillance
S.1.8. Develop technical specifications and procedures	K.1.8. Radiological impacts on the environment
S.1.9. Monitor and maintain a safe working environment	K.1.9. Contamination control, decontamination and reduction of sources of radiation
S.1.10. Apply appropriate radiation measurements for preliminary sample sorting	K.1.10. Classification of working areas and access control
S.1.11. Identify appropriate shielding for radiation sources	K.1.11. Use of protective equipment such as shielding and protective clothing
S.1.12. Characterise radiation sources and identify appropriate protection strategies	K.1.12. Storage arrangements for radioactive/contaminated items
	K.1.13. Emergency planning and emergency preparedness
Assessment criteria: Ability in developing procedures and specifications Capabilities in application of the ALARA implementation strategy Successful management of emergency situations Effectiveness of implementation of radiation protection programme	Sustainability of safety culture principles application Compliance with legislation in radiation protection area Realism of corrective measures evaluation
Recommended assessment methods: Situational judgement tests Case studies	Interview Written test Task solving

Unit of learning outcomes No.2: ACCIDENTS AND EMERGENCY ISSUES / TU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
Assume position and responsibility in emergency situations. Manage tasks prompt and reactive on changing situation in emergency case, distinguish and select the adequate data, stress control in emergency situation. Proper and prompt communication and reporting.	
Skills	Knowledge
S.2.1. Ensure execution of emergency plans S.2.2. Identify and detect emergency or hazards S.2.3. Monitor radiation situation in emergency case S.2.4. Preparing emergency plans S.2.5. Prepare emergency exercises S.2.6. Mitigate the consequences of accidental situation S.2.7. Protect personnel in restricted areas as well as on site S.2.8. Provide correct and prompt information to organisations and public S.2.9. Evaluate radiation situation in emergency case S.2.10. Predict next development of emergency case S.2.11. Rate abnormal situation S.2.12. Implement protective actions for incidental and accidental conditions S.2.13. Participate in accident event analysis S.2.14. Identify root causes S.2.15. Classify events (INES) S.2.16. Implement corrective measures	K.2.1. Emergency preparedness K.2.2. Emergency planning K.2.3. Several accident management K.2.4. Nuclear safety approaches, principles and requirements K.2.5. Relevant national and international legislation and guidelines K.2.6. Health protection K.2.7. Environmental protection K.2.8. Nuclear safety culture and human factor K.2.9. Nuclear facility components and systems K.2.10. Radiation ecology K.2.11. Contamination and decontamination K.2.12. Protective clothing and protective equipment K.2.13. Classification of area and access control K.2.14. International Nuclear Event Scale (INES) K.2.15. Safety assessment requirements
Assessment criteria:	
Ability for emergency planning and realisation of emergency plans	Appropriateness of corrective actions
Ability to make decision in emergency situations	Ability to apply ALARA and safety culture principles
Adequacy of dose measures and use of radiation control equipment	Behaviour in stress situations
Ability to evaluate the abnormal situation	Prompt reporting
Recommended assessment methods:	
Interview	
Situational judgement tests	
Case studies	
Task solving	
Written exam	

Unit of learning outcomes No.3: TEAM AND PROJECT MANAGEMENT/ TU (3.9.1;2.3.1; 3.7.1)

Autonomy/Responsibility

Taking responsibility for decision-making in daily operations and emergency situations in order to respect time schedule and costs for decommissioning installation. Take responsibility for managing professional development of individuals and groups under their responsibility. Take responsibility in strategic resource and workforce planning of the department. Manage and lead the team of professionals in radiation protection and waste management area in decommissioning phase.

Skills		Knowledge	
S.3.1.	Participate in recruitment process	K.3.1.	Organisation of human resources
S.3.2.	Plan initial and continuing specialised training for employees	K.3.2.	Social regulation
S.3.3.	Allocate tasks and assign personnel	K.3.3.	Workforce planning and recruitment process
S.3.4.	Prioritise objectives	K.3.4.	Individual and team performance
S.3.5.	Develop teamwork	K.3.5.	Managerial communication
S.3.6.	Anticipate and manage conflicts	K.3.6.	Team coordination and motivation
S.3.7.	Evaluate individual and team performance	K.3.7.	Resolution of conflict
S.3.8.	Perform managerial communication	K.3.8.	Work planning
S.3.9.	Propose activities for building successful teams	K.3.9.	Training solutions
S.3.10.	Promote individuals	K.3.10.	Change management
S.3.11.	Respect and apply national and international legislation	K.3.11.	Quality Management
S.3.12.	Promote safety culture, questioning attitude and rigorous and prudent approach	K.3.12.	Integrated Management System (conformity with ISO)
S.3.13.	Manage project	K.3.13.	General principles of knowledge management
		K.3.14.	General principles of configuration management
		K.3.15.	Project management
		K.3.16.	Budget, time and cost management
		K.3.17.	Organizational changes from operation to decommissioning

Assessment criteria:

Ability to plan, schedule and control daily work activities

Pertinence of workforce planning and adequacy of recruitment activities

Ability to manage financial resources

Proper application of integrated management system

Accurate solutions for solving complex problems in unpredictable and emergency situations

Ability to apply national and international standards

Ability to plan radioactive waste activities in decommissioning project according to strategic priorities
Pertinence of corrective actions to anticipate and reduce stress, and increase individual / team efficiency.

Appropriateness of managerial communication

Recommended assessment methods:

Interview

Situational judgement tests

Case studies

Task solving

Written exam

Unit of learning outcomes No.4: Interaction with other nuclear actors/departments TU (3.9.1;2.3.1; 3.7.1)	
Autonomy/Responsibility	
Interact with actors/departments involved in radioactive waste management, decommissioning phase of the NPP project. Taking responsibility for establishing and maintaining relationships with other departments, for participating decision-making in daily operations and emergency situations, for communicating the General Management decisions to the radioactive waste management team.	
Skills	Knowledge
<p>S.4.1. Integrate radwaste management strategy into the decommissioning plan</p> <p>S.4.2. Integrate radwaste management strategy into the overall management strategy of the plant</p> <p>S.4.3. Lead performance of complex analyses involving different facility's systems, structures, components and processes</p> <p>S.4.4. Perform proper communication in different areas of waste management</p> <p>S.4.5. Report activities and disseminate information</p> <p>S.4.6. Coordinate actors in waste management activities</p> <p>S.4.7. Share knowledge, information and experiences</p> <p>S.4.8. Analyse and upgrade decommissioning plans</p>	<p>K.4.1. General plant description and basic technical characteristics of nuclear facilities</p> <p>K.4.2. Nuclear fuel cycle</p> <p>K.4.3. Safety systems operation</p> <p>K.4.4. Radioactive waste treatment systems operation</p> <p>K.4.5. Applicable codes, regulations and standards for decommissioning phase</p> <p>K.4.6. Knowledge of plant (site, units') operational history</p> <p>K.4.7. Safety Analysis Report (SAR)</p> <p>K.4.8. Dismantling methods and techniques</p> <p>K.4.9. Key issues of facilities' maintenance, surveillance and inspection. Facility modifications</p> <p>K.4.10. Radiological characterization of the facility</p> <p>K.4.11. Decontamination techniques for equipment and SSCs</p> <p>K.4.12. Waste categorisation</p> <p>K.4.13. Knowledge management</p>
<p>Assessment criteria:</p> <p>Ability to organise and share knowledge, information and experiences</p> <p>Taking in account professional environment and constraints of design, technological systems and processes</p> <p>Compliance with safety standards, legislation and company policy</p>	
<p>Pertinence of plant key performance indicators</p> <p>Performance and effectiveness of business processes</p> <p>Accuracy of reports</p> <p>Pertinence of decommissioning plans analyse and upgrading</p>	
<p>Recommended assessment methods:</p> <p>Interview</p> <p>Situational judgement tests</p> <p>Case studies</p> <p>Task solving</p> <p>Written exam</p>	

Unit of learning outcomes No.5: EVALUATION AND OPTIMISATION OF INDIVIDUAL AND COLLECTIVE DOSES/ BU (3.9.1 ; 2.3.1)	
Autonomy/Responsibility	
<p>Manage complex activities concerning evaluation of individual and collective exposures (internal and external). Take responsibility for radiation protection actions implemented with respect to ALARA principle, regulation and rules. Advice other teams on radiation protection issues concerning decommissioning project.</p>	
Skills	Knowledge
<p>S.5.1. Monitor decommissioned areas S.5.2. Evaluate dose rates and radioactive contamination S.5.3. Evaluate the radiation situation S.5.4. Evaluate problems regarding radiation protection and dosimetry S.5.5. Ensure the maintenance of radiation protection instruments and materials S.5.6. Optimise radiation protection methods and techniques for decommissioning S.5.7. Provide information about radiological situation S.5.8. Analyse and upgrade decommissioning plans S.5.9. Comply with legal requirements of radiation protection and dosimetry in national regulations and rules S.5.10. Recommend personal and collective protective equipment</p>	<p>K.5.1. Measurement of radioactive characteristics K.5.2. Detectors for radiation monitoring K.5.3. Dosimetry (limits and norms) K.5.4. Radiation protection measures and technics K.5.5. Statistical assessment of data K.5.6. Modelling and simulation codes applied in dosimetry K.5.7. ALARA principles K.5.8. Nuclid vectors identification K.5.9. Stochastic approach in radiation impact K.5.10. Biological impacts of radiation doses</p>
<p>Assessment criteria:</p> <p>Ability to manage operational dosimetry data (cartography, computer modelling...).</p> <p>Ability to determine supervised and controlled areas.</p> <p>Pertinence of identification, quantification, and assessment of ionising radiations source term in decommissioned installation.</p>	
<p>Recommended assessment methods:</p> <p>Interview</p> <p>Situational judgement tests</p> <p>Case studies</p> <p>Task solving</p> <p>Written exam</p>	

Unit of learning outcomes No.6: Management of health, radiological and environmental risks BU (3.9.1; 2.3.1)	
Autonomy/Responsibility	
Perform and manage complex tasks to ensure compliance with national and international regulations and standards concerning management of health, radiological and environmental risks. Take responsibility for actions related to health in relation with medical service, radiological and environmental risks	
Skills	Knowledge
S.6.1. Evaluate health and radiological risks S.6.2. Evaluate environmental risks S.6.3. Apply risks assessment methods in decommissioning S.6.4. Provide internal information about risks assessment S.6.5. Undertake corrective measures S.6.6. Harmonise health and regulatory requirements S.6.7. Propose and implement corrective and preventive actions related to radiological and/or conventional risks S.6.8. Inform and/or train work teams to global approach "Health Safety Environment" S.6.9. Participate in workplace studies with related health, safety and medical department S.6.10. Create and use of health, radiological, and environmental databases	K.6.1. Risks assessment and management K.6.2. Health and environmental standards, codes and guidelines K.6.3. Biological acceptance of irradiation K.6.4. Health protection K.6.5. Environmental protection K.6.6. Radiation protection measures and technics K.6.7. Human behaviour related to health, radiological, and environmental risks K.6.8. Individual and collective protective equipment K.6.9. Management of health, radiological, and environmental data K.6.10. Train the trainers methodology
Assessment criteria: Ability to identify, quantify, assess and implement actions for safety hazards and risks Ability to lead measures and procedures on health effects and risk assessment and management methods for nuclear installation in decommissioning. Effective reporting to the company management related to health, radiological and environmental risks Pertinence of individual and collective protective measures Pertinence of data management Efficiency of training	
Recommended assessment methods: Interview Situational judgement tests Case studies Task solving Written exam	

Unit of learning outcomes No.7: RADIOACTIVE WASTE MANAGEMENT/ BU (2.3.1; 3.7.1)	
Autonomy/Responsibility	
Manage complex activities related to radioactive waste management including handling, treatment and storage. Take responsibility for decisions related to technologies, processes, nuclear and industrial safety as well as impact to environment.	
Skills	Knowledge
S.7.1. Evaluate and control the level of contamination and induced activities of radioactive waste S.7.2. Select optimal solution and manage radioactive waste categorisation S.7.3. Manage radioactive waste handling and transport S.7.4. Apply proper techniques for optimal storage of waste S.7.5. Apply proper criteria for treated waste classification and handling S.7.6. Evaluate and manage collected data about waste characteristics S.7.7. Ensure radiation protection support for waste manipulation and storage S.7.8. Evaluate radiation situation in decontamination, handling, transport and storage process S.7.9. Comply activities with national program in decommissioning S.7.10. Developing waste management program, specifications and procedures S.7.11 Apply appropriate solutions in packaging	K.7.1. Waste characterisation and categorisation K.7.2. Dosimetry K.7.3. Nuclear safety and radiation protection K.7.4. Relevant national and international legislation and guidelines K.7.5. Health protection K.7.6. Environmental protection K.7.7. Nuclear safety culture and human factor K.7.8. Protective clothing and protective equipment K.7.9. Transport, handling and storage of radioactive waste K.7.10. Treatment and long term storage K.7.11 National policy and program in decommissioning K.7.12. Waste conditioning including packaging
Assessment criteria:	
Accurate characterisation of radioactive waste Respect rules of radioactive waste handling and transport Proper use of radiation control equipment Pertinence of specifications and procedures proposals	Ability to approve radiation protection measures Compliance with international and national legislation
Recommended assessment methods:	
Written test Interview Situational judgement tests Case studies Task solving	

Methodology for designing a training program based on exit outcomes

The concept of training programme (TP) based on exit-outcomes includes six elements illustrated in Figure 1:

- learner: who is enrolled in the TP with the view of acquiring necessary competences (or learning outcomes/LO) for getting a qualification required by the labour market;
- exit outcomes: of the training program as a whole describes, in terms of qualifications or jobs, the labour market needs; also the TP-exit outcomes is the main motivation for learners to take a given training program/TP;
- content: is what the learners/students learn to reach the TP-exit outcomes;
- assessment: represent the examinations designed to assess the extent to which the learners had learned the content; assessment includes also content assessment based on the feedback from learners;
- support: represent learners-teachers interactions (courses, workshops, laboratories, etc) and support materials on paper/CD offered to learners in order to pass through the training programme and to reach the TP-exit outcomes;
- learning approach: defines how learners study the prescribed content (how to learn) and through this achieve the training program-exit outcomes.

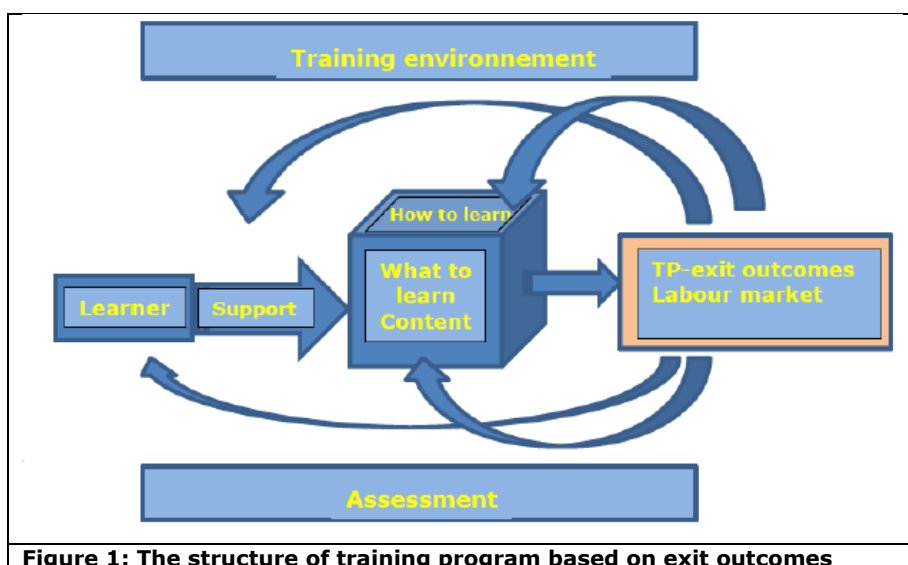


Figure 1: The structure of training program based on exit outcomes

Because the exit outcomes of a TP define, in terms of occupations or qualifications, the labour market needs, a TP based on exit outcomes is called also TP-market oriented.

Consideration of the training programme-exit outcomes should be the basis for training programme development and evaluation.

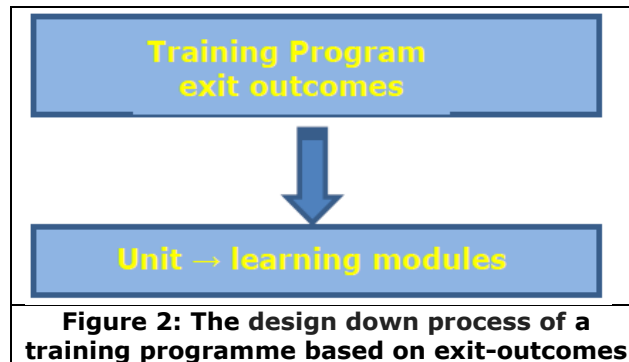
The exit outcomes of a training program determine the aims and objectives of the different training program phases.

The TP-Exit Outcome is a statement that has two main components:

- first component – identifies the core skills required for a specific job
- second component - additional skills.

A design sequence of a TP based on exit outcome would be adopted, as is shown in the Figure 2:

- the exit outcomes are first specified/defined;
- than the learning modules linked to each ULOs from a qualification are derived from these TP-exit outcomes and the process is repeated for each ULOs. Learning modules are developed by picking up skills and knowledge associated with a given ULOs in order to make pedagogical and coherent set.



Description of training programs based on exit outcomes

RADIOACTIVE WASTE MANAGEMENT (3.7.1)

Unit of learning outcomes No.1: RADIATION PROTECTION/ TU(3.9.1;2.3.1; 3.7.1)		
M1.1: Radiation sources and tools for registration - TM		Remarks/limits/advices
S.1.1. Develop specific provisions and procedures based on regulatory requirements on radioactive waste management S.1.6. Develop radiation protection procedures and framework in normal and emergency cases S.1.12. Characterise radiation sources and identify appropriate protection strategies	K.1.1. The main types of ionizing radiation and their effects K.1.2. Relevant national and international legislation and guidelines K.1.3. Dose definition, dose types, dose measures, dose constraints and reference levels K.1.10 Classification of working areas and access control	Basic experience in nuclear installation is recommended.
M1.2: Control and measurement in radiation protection - TM		Remarks/limits/advices
S.1.7. Use radiation control and measurement equipment S.1.8. Develop technical specifications and procedures S.1.9. Monitor and maintain a safe working environment S.1.10. Apply appropriate radiation measurements for preliminary sample sorting	K.1.4. Radiation monitoring, workplace monitoring and individual monitoring K.1.9. Contamination control, decontamination and reduction of sources of radiation	Prerequisite: M1.1
M1.3: Radiation protection implementation - TM		Remarks/limits/advices
S.1.2. Implement ALARA principle to define optimised radiation protection actions S.1.3. Confirm work permits S.1.4. Optimize the occupational radiation protection programme S.1.5. Define and/or apply principle strategies of a radiation protection programme during various phases of a nuclear installation S.1.11. Identify appropriate shielding for radiation sources	K.1.5. Radiation protection programs K.1.6. ALARA principle and procedures K.1.7. Health surveillance K.1.8. Radiological impacts on the environment K.1.11 Use of protective equipment such as shielding and protective clothing K.1.12 Storage arrangements for radioactive/contaminated items K.1.13 Emergency planning and emergency preparedness	Prerequisite: M1.2 Experience from radiation protection is expected.
Unit of learning outcomes No.2: ACCIDENTS AND EMERGENCY ISSUES / TU(3.9.1;2.3.1; 3.7.1)		
M2.1: Nuclear safety fundamentals and safety assessment - TM		Remarks/limits/advices
S.2.6. Mitigate the consequences of accidental situation S.2.12. Implement protective actions for incidental and accidental conditions S.2.13. Participate in accident event analysis S.2.14. Identify root causes S.2.15. Classify events (INES) S.2.16. Implement corrective measures	K.2.3. Severe accident management K.2.4. Nuclear safety approaches, principles and requirements K.2.5. Relevant national and international legislation and guidelines K.2.8. Nuclear safety culture and human factor K.2.9. Nuclear facility components and systems K.2.14. International Nuclear Event Scale (INES)	Basic skills and knowledge. Defense in depth is embedded in K.2.4 Deterministic and probabilistic safety analysis is embedded in K.2.15

	K.2.15. Safety assessment requirements	
M2.2: Emergency measures - TM		Remarks/limits/advices
S.2.1. Ensure execution of emergency plans S.2.2. Identify and detect emergency or hazards S.2.3. Monitor radiation situation in emergency case S.2.4. Preparing emergency plans S.2.5. Prepare emergency exercises S.2.7. Protect personnel in restricted areas as well as on site S.2.8. Provide correct and prompt information to organisations and public S.2.9. Evaluate radiation situation in emergency case S.2.10. Predict next development of emergency case S.2.11. Rate abnormal situation	K.2.1. Emergency preparedness K.2.2. Emergency planning K.2.6. Health protection K.2.7. Environmental protection K.2.10. Radiation ecology K.2.11. Contamination and decontamination K.2.12. Protective clothing and protective equipment K.2.13. Classification of area and access control	Prerequisite: M2.1
Unit of learning outcomes No.3: TEAM AND PROJECT MANAGEMENT/ TU(3.9.1;2.3.1; 3.7.1)		
M3.1: Recruitment and work organisation - TM		Remarks/limits/advices
S.3.1. Participate in recruitment process S.3.3. Allocate tasks and assign personnel S.3.4. Prioritise objectives S.3.10. Perform managerial communication	K.3.1. Organisation of human resources K.3.2. Social regulation K.3.3. Recruitment process K.3.6. Managerial communication K.3.9. Work planning K.3.14. Organizational changes from operation to decommissioning K.3.16. Policies and key issues of facilities' maintenance, surveillance and inspection. Facility modifications; basics of configuration management	
M3.2 :Team coaching - TM		Remarks/limits/advices
S.3.5. Develop teamwork S.3.6. Propose activities for building successful teams S.3.2. Plan training S.3.7. Anticipate and manage conflicts S.3.11. Promote safety culture and learning attitude towards safety S.3.8. Evaluate individual and team performance S.3.9. Promote individuals	K.3.4. Individual and team performance K.3.7. Team coordination and motivation K.3.8. Resolution of conflict K.3.10. Training solutions K.3.5. Change management K.3.12 Quality Management K.3.13 Knowledge Management	
M3.3 : Project management - TM		Remarks/limits/advices
S.3.12. Monitor project	K.3.5. Project management K.3.14 Budget, time and cost management	
Unit of learning outcomes No.4: INTERACTION WITH OTHER NUCLEAR ACTORS/DEPARTMENTS		

TU(3.9.1;2.3.1; 3.7.1)			
M4.1: INTERACTION WITH OTHER NUCLEAR ACTORS/DEPARTMENTS		Remarks/limits/advices	
S.4.9. Integrate radwaste management strategy into the decommissioning plan	K.4.14. General plant description and basic technical characteristics of nuclear facilities		
S.4.10. Integrate radwaste management strategy into the overall management strategy of the plant	K.4.15. Nuclear fuel cycle		
S.4.11. Lead performance of complex analyses involving different facility's systems, structures, components and processes	K.4.16. Safety systems operation		
S.4.12. Perform proper communication in different areas of waste management	K.4.17. Radioactive waste treatment systems operation		
S.4.13. Report activities and disseminate information	K.4.18. Applicable codes, regulations and standards for decommissioning phase		
S.4.14. Coordinate actors in waste management activities	K.4.19. Knowledge of plant (site, units) operational history		
S.4.15. Share knowledge, information and experiences	K.4.20. Safety Analysis Report (SAR)		
S.4.16. Analyse and upgrade decommissioning plans	K.4.21. Dismantling methods and techniques		
	K.4.22. Key issues of facilities' maintenance, surveillance and inspection ; facility modifications		
	K.4.23. Radiological characterization of the facility		
	K.4.24. Decontamination techniques for equipment and SSCs		
	K.4.25. Waste categorisation		
	K.4.13. Knowledge management		
Unit of learning outcomes No.5: DECOMMISSIONING MANAGEMENT/ SU (3.7.1.)			
M5.1: Decommissioning management			Remarks/limits/advices
S.5.1. Participate and/or organize decommissioning activities	K.5.1. Waste origin and handlings		This module will be merge with "decommissioning of nuclear installations" related to Unit "Management of decommissioning projects -TU"
S.5.2. Organise decommissioning work	K.5.2. Contamination, decontamination		
S.5.3. Prioritise objectives	K.5.3. Decontamination technologies and tools		
S.5.4. Use the optimal tools and technology in decommissioning	K.5.4. Radioecology and environmental remediation		
S.5.5. Evaluate efficiency of decontamination	K.5.5. Partitioning and compacting		
S.5.6. Monitor waste accumulation and transport	K.5.6. Decommissioning procedures		
	K.5.7. Limits for free release		
	K.5.8. Prediction and simulating of activation		
Unit of learning outcomes No.6: RADIOACTIVE WASTE MANAGEMENT/ BU(3.7.1 ; 2.3.1)			
M6.1: Handling and transport radioactive waste		Remarks/limits/advices	
S.6.1. Evaluate and control the level of contamination and induced activities of radioactive waste	K.6.1. Waste characterisation and categorisation		
S.6.2. Select optimal solution and manage radioactive waste categorisation	K.6.2. Dosimetry		
S.6.3. Manage radioactive waste handling and transport	K.6.3. Nuclear safety and radiation protection		
S.6.5. Apply proper criteria for treated waste classification and	K.6.5. Health protection		
	K.6.6. Environmental protection		
	K.6.7. Nuclear safety culture and human factor		
	K.6.8. Protective clothing and protective		

<p>handling S.6.6. Evaluate and manage collected data about waste characteristics S.6.9. Comply activities with national program in decommissioning S.6.10. Developing waste management program, specifications and procedures S.6.11. Apply appropriate solutions in packaging</p>	<p>equipment K.6.9. Transport, handling and storage of radioactive waste K.6.12. Waste conditioning including packaging</p>	
<p>M6.2: Storage radioactive waste</p>		
<p>S.6.4. Apply proper techniques for optimal storage of waste S.6.7. Ensure radiation protection support for waste manipulation and storage S.6.8. Evaluate radiation situation in decontamination, handling, transport and storage process</p>	<p>K.6.4. Relevant national and international legislation and guidelines K.6.10. Treatment and long term storage K.6.11. National policy and program in decommissioning</p>	<p>M7.1 is recommended as a prerequisite</p>

PREPARATORY WORK MANAGEMENT (3.3.1)

Unit 1: MANAGEMENT OF DECOMMISSIONING PROJECTS/ TU (3.1.1; 3.3.1; 3.8.1)		
M1.1	Project Management	
	S.1.1. Coordinate planning, scheduling, implementing and monitoring activities and projects S.1.2. Manage resources involved in the project S.1.4. Perform risk estimation and management and cost control. S.1.5. Select contractors and establish contracts S.1.7. Intervene, analyse, manage and resolve business and technical conflicts between the company and the contractors	K.1.4. Risk estimation and management K.1.5. Management and workflow of the project K.1.6. Information technology K.1.12. Decommissioning funds and financial mechanism
M1.2	Decommissioning of nuclear instalations	
	S.1.3. Monitor implementation of plans and procedures to ensure compliance with safety procedures and legislation S.1.6. Develop decommissioning project specifications, scopes-of-work, and prepare tender procedures S.2.8. Develop procedures and obtain permits (licensing for decommissioning)	K.1.1. Decommissioning methodology, techniques and strategies K.1.2. Environmental impact of nuclear power; K.1.3. Remediation methods; K.1.7. Nuclear decommission practices: clean up of radioactivity (remediation) and plant demolition K.1.8. Radioactivity and nuclear science and engineering K.1.9. Management of civil engineering operations K.1.10. Decommissioning regulation and licensing: site characterization, dismantlement activities, plans for site remediation, detailed plans for final radiation surveys for release of the site, environmental change.
Unit 2: SAFETY AND SECURITY / TU (3.1.1; 3.3.1; 3.8.1)		
M2.1	Safety and risk analysis	Remarks/limits/advices
	S.2.4. Apply regulations issued by different authorities S.2.7. Perform appropriate hazard and accident analysis	K.2.1. National and international regulations and standards K.2.3. Industrial safety K.2.10. Risk assessment Safety culture is about attitude that is why Safety culture should be emphasized in each unit of a qualification in the A/R box and not as a training module.
M2.2	Nuclear and radiological safety	
	S.2.1. Provide training and information about the special procedures as emergency, potential risks on workers' health, nuclear safety and security S.2.2. Analyze and interpret the licensing requirements S.2.3. Identification of safety requirements S.2.6. Review processes,	K.2.1. National licensing requirements K.2.5. Waste and transport safety K.2.6. Emergency preparedness K.2.7. Clearance of material and site release K.2.11. Environmental site remediation K.2.2. Radiation protection (ALARA concept, dose commitment to workers and

	<p>systems and activities in the facilities S.5.8. Develop and document the safety function, functional performance requirements and performance criteria</p> <p>S.2.10. Prepare safety basis documents: Conceptual Safety Design Reports, Preliminary Safety Design Reports, Preliminary Documented Safety Analyses, Documented Safety Analyses and Technical Safety Requirements</p>	<p>environment, radiation protection methods and tools)</p> <p>K.2.9. Radiological hazard analysis</p>	
M2.3	Security		
	S.2.11. Monitor and control security, safeguard and non-proliferation requirements	K.2.8. Nuclear security, safeguard and non-proliferation	
No. 3: OPERATION, MAINTANANCE AND ENGINEERING SUPPORT/ SU 3.3.1			
M3.1	Operation		
	<p>S.3.1. Plan, implement, co-ordinate and monitor operation activities</p> <p>S.3.5. Provide technical information for operation, activities</p>	<p>K.3.1. Decommissioning methodology</p> <p>K.3.2. Electrical and mechanical installations</p> <p>K.3.3. Radioactive waste treatment systems</p> <p>K.3.4. Process System engineering and design</p> <p>K.3.5. Electrical engineering and design</p> <p>K.3.6. Mechanical engineering and design</p> <p>K.3.7. HVAC engineering and design</p> <p>K.3.8. Fire protection engineering and design</p> <p>K.3.10. Engineering principles (i.e. mechanical, electrical, instrumentation and control)</p> <p>K.3.11. Site specific rules and procedures (permit to work, standard operating & maintenance procedures and risk assessment etc.)</p>	
M3.2	Maintenance		
	<p>S.3.2. Plan, implement, co-ordinate and monitor maintenance activities</p> <p>S.3.6. Provide technical information for maintenance, activities</p>	<p>K.3.1. Decommissioning methodology</p> <p>K.3.2. Electrical and mechanical installations</p> <p>K.3.3. Radioactive waste treatment systems</p> <p>K.3.4. Process System engineering and design</p> <p>K.3.5. Electrical engineering and design</p> <p>K.3.6. Mechanical engineering and design</p> <p>K.3.7. HVAC engineering and design</p> <p>K.3.8. Fire protection engineering and design</p> <p>K.3.9. Techniques and methodologies of decontamination within scope</p> <p>K.3.10. Engineering principles (i.e. mechanical, electrical, instrumentation and control)</p> <p>K.3.11. Site specific rules and procedures (permit to work, standard operating & maintenance procedures and risk assessment etc.)</p> <p>K.3.12. Equipment and system operating and maintenance instructions</p>	

M3.3	Engineering support	
	<p>S.3.3. Plan, implement, co-ordinate and monitor engineering support activities</p> <p>S.3.6. Provide technical information for engineering support activities</p> <p>S.3.7. Draft work instructions related to engineering support</p> <p>S.3.7. Specify functional requirements</p> <p>S.3.8. Understanding of complex regulations and procedures</p> <p>S.3.9. Perform inspection, evaluation and control of works</p> <p>S.3.11. Specify design requirements</p> <p>S.3.12. Assess design options</p> <p>S.3.13. Document design modifications</p> <p>S.3.15. Draft technical specification and requirements</p> <p>S.3.16. Use and interpret engineering drawings and documents</p>	<p>K.3.1. Decommissioning methodology</p> <p>K.3.2. Electrical and mechanical installations</p> <p>K.3.3. Radioactive waste treatment systems</p> <p>K.3.4. Process System engineering and design</p> <p>K.3.5. Electrical engineering and design</p> <p>K.3.6. Mechanical engineering and design</p> <p>K.3.7. HVAC engineering and design</p> <p>K.3.8. Fire protection engineering and design</p> <p>K.3.10. Engineering principles (i.e. mechanical, electrical, instrumentation and control)</p>
	Remark: The knowledge listed for operation, maintenance and engineering support should be adapted to the particularities of each activity.	
No. 4: PREPARATORY WORK AND SPENT FUEL/ SU 3.3.1		
M4.1	Spent fuel	
	<p>S.4.1. Organize treatment of damaged fuel elements</p> <p>S.4.2. Defining engineering processes</p> <p>S.4.3. Draft technical specifications and working documents related to decommissioning activities and spent fuel management</p> <p>S.4.4. Identify and analyze radiological incidents</p> <p>S.4.5. Report technical and regulatory data according to standard operating procedures</p> <p>S.4.6. Organise and monitor storage, handling, packaging and transport of spent fuel</p>	<p>K.4.1. Nuclear physics fundamentals</p> <p>K.4.6. Nuclear standards</p> <p>K.4.10. Inspection of spent fuel assemblies and special conditioning of damaged elements</p> <p>K.4.11. Spent fuel management, including damaged fuel elements</p> <p>K.4.12. Spent fuel transport (preparation of packaging,)</p> <p>K.4.4. Nuclear safety (criticality, heat generation, radiolysis)</p>
M4.2	Preparatory work on the decommissioning site	
	<p>S.4.7. Planning, implementing, coordinating and monitoring engineering activities</p> <p>S.4.8. Plan decommissioning site preparation</p> <p>S.4.9. Prepare controlled work areas for decommissioning activities and Design Radiation protection barriers</p> <p>S.4.10. Implement design modifications</p> <p>S.4.11. Apply defense in depth principle in design</p>	<p>K.4.2. Nuclear engineering</p> <p>K.4.5. Radiation fundamentals</p> <p>K.4.3. Nuclear installation systems and components</p> <p>K.4.7. Decommissioning techniques</p> <p>K.4.8. Chemical Engineering and Waste Management</p> <p>K.4.9. Radioactive waste handling and storage</p>

RADIATION PROTECTION EXPERT (3.9.1.)

Unit of learning outcomes No.1: RADIATION PROTECTION/TU(3.9.1;2.3.1; 3.7.1)		
M1.1: Radiation sources and tools for registration - TM		Remarks/limits/advices
S.1.1. Develop specific provisions and procedures based on regulatory requirements on radioactive waste management S.1.6. Develop radiation protection procedures and framework in normal and emergency cases S.1.12. Characterise radiation sources and identify appropriate protection strategies	K.1.1. The main types of ionizing radiation and their effects K.1.2. Relevant national and international legislation and guidelines K.1.3. Dose definition, dose types, dose measures, dose constraints and reference levels K.1.10 Classification of working areas and access control	Basic experience in nuclear installation is recommended.
M1.2: Control and measurement in radiation protection - TM		Remarks/limits/advices
S.1.7. Use radiation control and measurement equipment S.1.8. Develop technical specifications and procedures S.1.9. Monitor and maintain a safe working environment S.1.10. Apply appropriate radiation measurements for preliminary sample sorting	K.1.4. Radiation monitoring, workplace monitoring and individual monitoring K.1.9. Contamination control, decontamination and reduction of sources of radiation	Prerequisite: M1.1
M1.3: Radiation protection implementation - TM		Remarks/limits/advices
S.1.2. Implement ALARA principle to define optimised radiation protection actions S.1.3. Confirm work permits S.1.4. Optimize the occupational radiation protection programme S.1.5. Define and/or apply principle strategies of a radiation protection programme during various phases of a nuclear installation S.1.11. Identify appropriate shielding for radiation sources	K.1.5. Radiation protection programs K.1.6. ALARA principle and procedures K.1.7. Health surveillance K.1.8. Radiological impacts on the environment K.1.11 Use of protective equipment such as shielding and protective clothing K.1.12 Storage arrangements for radioactive/contaminated items K.1.13 Emergency planning and emergency preparedness	Prerequisite: M1.2 Experience from radiation protection is expected.
Unit of learning outcomes No.2: ACCIDENTS AND EMERGENCY ISSUES/ TU(3.9.1;2.3.1; 3.7.1)		
M2.1: Nuclear safety fundamentals and safety assessment		Remarks/limits/advices

<p>S.2.6. Mitigate the consequences of accidental situation S.2.12. Implement protective actions for incidental and accidental conditions S.2.13. Participate in accident event analysis S.2.14. Identify root causes S.2.15. Classify events (INES) S.2.16. Implement corrective measures</p>	<p>K.2.3. Severe accident management K.2.4. Nuclear safety approaches, principles and requirements K.2.5. Relevant national and international legislation and guidelines K.2.8. Nuclear safety culture and human factor K.2.9. Nuclear facility components and systems K.2.14. International Nuclear Event Scale (INES) K.2.15. Safety assessment requirements</p>	<p>Basic skills and knowledge. Defense in depth is embedded in K.2.4 Deterministic and probabilistic safety analysis is embedded in K.2.15</p>
<p>M2.2: Emergency measures</p>		<p>Remarks/limits/advices</p>
<p>S.2.1. Ensure execution of emergency plans S.2.2. Identify and detect emergency or hazards S.2.3. Monitor radiation situation in emergency case S.2.4. Preparing emergency plans S.2.5. Prepare emergency exercises S.2.7. Protect personnel in restricted areas as well as on site S.2.8. Provide correct and prompt information to organisations and public S.2.9. Evaluate radiation situation in emergency case S.2.10. Predict next development of emergency case S.2.11. Rate abnormal situation</p>	<p>K.2.1. Emergency preparedness K.2.2. Emergency planning K.2.6. Health protection K.2.7. Environmental protection K.2.10. Radiation ecology K.2.11. Contamination and decontamination K.2.12. Protective clothing and protective equipment K.2.13. Classification of area and access control</p>	<p>Prerequisite: M2.1</p>
<p>Unit of learning outcomes No.3: TEAM AND PROJECT MANAGEMENT / TU(3.9.1;2.3.1; 3.7.1)</p>		
<p>M3.1: Recruitment and work organisation</p>		<p>Remarks/limits/advices</p>
<p>S.3.1. Participate in recruitment process S.3.3. Allocate tasks and assign personnel S.3.4. Prioritise objectives S.3.10. Perform managerial communication</p>	<p>K.3.1. Organisation of human resources K.3.2. Social regulation K.3.3. Recruitment process K.3.6. Managerial communication K.3.9. Work planning K.3.14. Organizational changes from operation to decommissioning K.3.16. Policies and key issues of facilities' maintenance, surveillance and inspection. Facility modifications; basics of configuration management</p>	
<p>M3.2 :Team coaching</p>		<p>Remarks/limits/advices</p>
<p>S.3.5. Develop teamwork S.3.6. Propose activities for building successful teams S.3.2. Plan training S.3.7. Anticipate and manage conflicts S.3.11. Promote safety culture and learning attitude towards safety S.3.8. Evaluate individual and team performance S.3.9. Promote individuals</p>	<p>K.3.4. Individual and team performance K.3.7. Team coordination and motivation K.3.8. Resolution of conflict K.3.10. Training solutions K.3.5. Change management K.3.12 Quality Management K.3.13 Knowledge Management</p>	
<p>M3.3 : Project management</p>		<p>Remarks/limits/advices</p>

S.3.12. Monitor project	K.3.5. Project management K.3.14 Budget, time and cost management	
Unit of learning outcomes No.4: INTERACTION WITH OTHER NUCLEAR ACTORS/DEPARTMENTS - TM		
M4.1: INTERACTION WITH OTHER NUCLEAR ACTORS/DEPARTMENTS		Remarks/limits/advices
S.4.1. Integrate radwaste management strategy into the decommissioning plan S.4.2. Integrate radwaste management strategy into the overall management strategy of the plant S.4.3. Lead performance of complex analyses involving different facility's systems, structures, components and processes S.4.4. Perform proper communication in different areas of waste management S.4.5. Report activities and disseminate information S.4.6. Coordinate actors in waste management activities S.4.7. Share knowledge, information and experiences S.4.8. Analyse and upgrade decommissioning plans	K.4.1. General plant description and basic technical characteristics of nuclear facilities K.4.2. Nuclear fuel cycle K.4.3. Safety systems operation K.4.4. Radioactive waste treatment systems operation K.4.5. Applicable codes, regulations and standards for decommissioning phase K.4.6. Knowledge of plant (site, units) operational history K.4.7. Safety Analysis Report (SAR) K.4.8. Dismantling methods and techniques K.4.9. Key issues of facilities' maintenance, surveillance and inspection ; facility modifications K.4.10. Radiological characterization of the facility K.4.11. Decontamination techniques for equipment and SSCs K.4.12. Waste categorisation K.4.13. Knowledge management	
Unit of learning outcomes No.5: EVALUATION AND OPTIMISATION OF INDIVIDUAL AND COLLECTIVE DOSES / BU (3.9.1; 2.3.1)		
M5.1: EVALUATION AND OPTIMISATION OF INDIVIDUAL AND COLLECTIVE DOSES		Remarks/limits/advices
S.5.1. Monitor decommissioned areas S.5.2. Evaluate dose rates and radioactive contamination S.5.3. Evaluate the radiation situation S.5.4. Evaluate problems regarding radiation protection and dosimetry S.5.5. Ensure the maintenance of radiation protection instruments and materials S.5.6. Optimise radiation protection methods and techniques for decommissioning S.5.7. Provide information about radiological situation S.5.8. Analyse and upgrade decommissioning plans S.5.9. Comply with legal requirements of radiation protection and dosimetry in national regulations and rules S.5.10. Recommend personal and	K.5.1. Measurement of radioactive characteristics K.5.2. Detectors for radiation monitoring K.5.3. Dosimetry (limits and norms) K.5.4. Radiation protection measures and technics K.5.5. Statistical assessment of data K.5.6. Modelling and simulation codes applied in dosimetry K.5.7. ALARA principles K.5.8. Radionuclide vectors identification K.5.9. Stochastic approach in radiation impact K.5.10. Biological impacts of radiation doses	

collective protective equipment		
Unit of learning outcomes No.6: MANAGEMENT OF HEALTH, RADIOLOGICAL AND ENVIRONMENTAL RISKS / BU (3.9.1; 2.3.1)		
M6.1: Management of health, radiological and environmental risks		Remarks/limits/advices
<p>S.6.1. Evaluate health and radiological risks</p> <p>S.6.2. Evaluate environmental risks</p> <p>S.6.3. Apply risks assessment methods in decommissioning</p> <p>S.6.4. Provide internal information about risks assessment</p> <p>S.6.5. Undertake corrective measures</p> <p>S.6.6. Harmonise health and regulatory requirements</p> <p>S.6.7. Propose and implement corrective and preventive actions related to radiological and/or conventional risks</p> <p>S.6.8. Inform and/or train work teams to global approach "Health Safety Environment"</p> <p>S.6.9. Participate in workplace studies related to health, safety and medical department</p> <p>S.6.10. Create and use of health, radiological, and environmental databases</p>	<p>K.6.1. Risks assessment and management</p> <p>K.6.2. Health and environmental standards, codes and guidelines</p> <p>K.6.3. Biological acceptance of irradiation</p> <p>K.6.4. Health protection</p> <p>K.6.5. Environmental protection</p> <p>K.6.6. Radiation protection measures and technics</p> <p>K.6.7. Human behaviour related to health, radiological, and environmental risks</p> <p>K.6.8. Individual and collective protective equipment</p> <p>K.6.9. Management of health, radiological, and environmental data</p> <p>K.6.10. Train the trainers methodology</p>	

2.4.4. MANAGEMENT OF MAINTENANCE IN DECOMMISSIONING (3.8.1.)

Unit 1: MANAGEMENT OF DECOMMISSIONING PROJECTS/ TU (3.1.1; 3.3.1; 3.8.1)	
M1.1	Project Management
	<p>S.1.1. Coordinate planning, scheduling, implementing and monitoring activities and projects</p> <p>S.1.2. Manage resources involved in the project</p> <p>S.1.4. Perform risk estimation and management and cost control.</p> <p>S.1.5. Select contractors and establish contracts</p> <p>S.1.6. Develop decommissioning project specifications, scopes-of-work, and prepare tender procedures</p> <p>S.1.7. Intervene, analyse, manage and resolve business and technical conflicts between the company and the contractors</p>
	<p>K.1.4. Risk estimation and management</p> <p>K.1.5. Management and workflow of the project</p> <p>K.1.6. Information technology</p> <p>K.1.12. Decommissioning funds and financial mechanism</p>
M1.2	Decommissioning of nuclear instalations
	<p>S.1.3. Monitor implementation of plans and procedures to ensure compliance with safety procedures and legislation</p> <p>S.1.6. Develop decommissioning project specifications, scopes-of-work, and prepare tender procedures</p> <p>S.1.8. Develop procedures and obtain permits (licensing for decommissioning)</p>
	<p>K.1.1. Decommissioning methodology, techniques and strategies</p> <p>K.1.2. Environmental impact of nuclear power;</p> <p>K.1.3. Remediation methods;</p> <p>K.1.7. Nuclear decommission practices: clean up of radioactivity (remediation) and plant demolition</p> <p>K.1.8. Radioactivity and nuclear science and engineering</p> <p>K.1.9. Management of civil engineering operations</p> <p>K.1.10. Decommissioning regulation and licensing: site characterization, dismantlement activities, plans for site remediation, detailed plans for final radiation surveys for release of the site, environmental change.</p>
Unit 2: SAFETY AND SECURITY/ TU (3.1.1; 3.3.1; 3.8.1)	
M2.1	Safety and risk analysis
	<p>S.2.4. Apply regulations issued by different authorities</p> <p>S.2.7. Perform appropriate hazard and accident analysis</p>
	<p>K.2.2. National and international regulations and standards</p> <p>K.2.4. Industrial safety</p> <p>K.2.10. Risk assessment</p>
M2.2	Nuclear and radiological safety
	<p>S.2.1. Provide training and information about the special procedures as emergency, potential risks on workers' health, nuclear safety and security</p> <p>S.2.2. Analyze and interpret the licensing requirements</p> <p>S.2.3. Identification of safety requirements</p> <p>S.2.6. Review processes, systems and activities in the facilities</p> <p>S.5.8. Develop and document the safety function, functional performance requirements and performance criteria</p>
	<p>K.2.1. National licensing requirements</p> <p>K.2.3. Radiation protection (ALARA concept, dose commitment to workers and environment, radiation protection methods and tools)</p> <p>K.2.6. Waste and transport safety</p> <p>K.2.7. Emergency preparedness</p> <p>K.2.8. Clearance of material and site release</p> <p>K.2.12. Environmental site remediation</p> <p>K.2.11. Radiological hazard analysis</p>

	S.2.10. Prepare safety basis documents: Conceptual Safety Design Reports, Preliminary Safety Design Reports, Preliminary Documented Safety Analyses, Documented Safety Analyses	
M2.3	Security	
	S.2.11. Monitor and control security, safeguard and non-proliferation requirements	K.2.8. Nuclear security, safeguard and non- proliferation
Unit 3: FACILITY MAINTENANCE/ SU 3.8.1		
M3.1	Development of maintenance programs	
	S.3.1. Select the maintenance strategy(s) S.3.2. Select the maintenance technique(s) S.3.3. Design the maintenance program S.3.4. Search for new equipment and technology	K.3.6. Maintenance strategies: i.e.: reactive (RM), preventive (PM), predictive (PdM), proactive centered maintenance (PCM) K.3.7. Maintenance techniques: i.e.: condition monitoring (CM), reliability centered maintenance (RCM), Failure Modes & Effects Analysis (FMEA), Failure Modes, Effects, and Criticality Analyses (FMECA), Root Cause Failure Analysis (RCFA), Computerized Maintenance Management System (CMMS), Taxonomy
M3.2	Conducting maintenance	
	S.3.5. Conducting regular site visits to ensure optimal maintenance performance S.3.6. Oversee the installation, repair and maintenance of structures, systems and components	K.3.1. Plant systems including machines, mechanical systems, electrical systems, buildings and structures K.3.3. Mechanical and electrical maintenance
M3.3	Waste management	
	S.3.7. Manage hazardous chemical and radioactive wastes	K.3.4. Radioactive materials and waste fundamentals – characterization, processing, disposal, transportation

2.4.5. MANAGEMENT OF RADIOACTIVE WASTE & RP (2.3.1.)

Unit of learning outcomes No.1: RADIATION PROTECTION TU (3.9.1;2.3.1; 3.7.1)		
M1.1: Radiation sources and tools for registration - TM		Remarks/limits/advices
S.1.1. Develop specific provisions and procedures based on regulatory requirements on radioactive waste management S.1.6. Develop radiation protection procedures and framework in normal and emergency cases S.1.12. Characterise radiation sources and identify appropriate protection strategies	K.1.1. The main types of ionizing radiation and their effects K.1.2. Relevant national and international legislation and guidelines K.1.3. Dose definition, dose types, dose measures, dose constraints and reference levels K.1.10 Classification of working areas and access control	Basic experience in nuclear installation is recommended.
M1.2: Control and measurement in radiation protection - TM		Remarks/limits/advices
S.1.7. Use radiation control and measurement equipment S.1.8. Develop technical specifications and procedures S.1.9. Monitor and maintain a safe working environment S.1.10. Apply appropriate radiation measurements for preliminary sample sorting	K.1.4. Radiation monitoring, workplace monitoring and individual monitoring K.1.9. Contamination control, decontamination and reduction of sources of radiation	Prerequisite: M1.1
M1.3: Radiation protection implementation - TM		Remarks/limits/advices
S.1.2. Implement ALARA principle to define optimised radiation protection actions S.1.3. Confirm work permits S.1.4. Optimize the occupational radiation protection programme S.1.5. Define and/or apply principle strategies of a radiation protection programme during various phases of a nuclear installation S.1.11. Identify appropriate shielding for radiation sources	K.1.5. Radiation protection programs K.1.6. ALARA principle and procedures K.1.7. Health surveillance K.1.8. Radiological impacts on the environment K.1.11 Use of protective equipment such as shielding and protective clothing K.1.12 Storage arrangements for radioactive/contaminated items K.1.13 Emergency planning and emergency preparedness	Prerequisite: M1.2 Experience from radiation protection is expected.
Unit of learning outcomes No.2: ACCIDENTS AND EMERGENCY ISSUES TU (3.9.1;2.3.1; 3.7.1)		
M2.1: Nuclear safety fundamentals and safety assessment		Remarks/limits/advices
S.2.6. Mitigate the consequences of accidental situation S.2.12. Implement protective actions for incidental and accidental conditions S.2.13. Participate in accident event analysis S.2.14. Identify root causes S.2.15. Classify events (INES) S.2.16. Implement corrective measures	K.2.3. Severe accident management K.2.4. Nuclear safety approaches, principles and requirements K.2.5. Relevant national and international legislation and guidelines K.2.8. Nuclear safety culture and human factor K.2.9. Nuclear facility components and systems K.2.14. International Nuclear Event Scale (INES) K.2.15. Safety assessment requirements	Basic skills and knowledge. Defense in depth is embedded in K.2.4 Deterministic and probabilistic safety analysis is embedded in K.2.15
M2.2: Emergency measures		Remarks/limits/advices

<p>S.2.1. Ensure execution of emergency plans S.2.2. Identify and detect emergency or hazards S.2.3. Monitor radiation situation in emergency case S.2.4. Preparing emergency plans S.2.5. Prepare emergency exercises S.2.7. Protect personnel in restricted areas as well as on site S.2.8. Provide correct and prompt information to organisations and public S.2.9. Evaluate radiation situation in emergency case S.2.10. Predict next development of emergency case S.2.11. Rate abnormal situation</p>	<p>K.2.1. Emergency preparedness K.2.2. Emergency planning K.2.6. Health protection K.2.7. Environmental protection K.2.10. Radiation ecology K.2.11. Contamination and decontamination K.2.12. Protective clothing and protective equipment K.2.13. Classification of area and access control</p>	<p>Prerequisite: M2.1</p>
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Unit of learning outcomes No.3: TEAM AND PROJECT MANAGEMENT TU (3.9.1;2.3.1; 3.7.1)		
M3.1: Recruitment and work organisation		Remarks/limits/advices
<p>S.3.1. Participate in recruitment process S.3.3. Allocate tasks and assign personnel S.3.4. Prioritise objectives S.3.10. Perform managerial communication</p>	<p>K.3.1. Organisation of human resources K.3.2. Social regulation K.3.3. Recruitment process K.3.6. Managerial communication K.3.9. Work planning K.3.14. Organizational changes from operation to decommissioning K.3.16. Policies and key issues of facilities' maintenance, surveillance and inspection. Facility modifications; basics of configuration management</p>	
M3.2 :Team coaching		Remarks/limits/advices
<p>S.3.5. Develop teamwork S.3.6. Propose activities for building successful teams S.3.2. Plan training S.3.7. Anticipate and manage conflicts S.3.11. Promote safety culture and learning attitude towards safety S.3.8. Evaluate individual and team performance S.3.9. Promote individuals</p>	<p>K.3.4. Individual and team performance K.3.7. Team coordination and motivation K.3.8. Resolution of conflict K.3.10. Training solutions K.3.5. Change management K.3.12 Quality Management K.3.13 Knowledge Management</p>	
M3.3 : Project management		Remarks/limits/advices
<p>S.3.12. Monitor project</p>	<p>K.3.5. Project management K.3.14 Budget, time and cost management</p>	
Unit of learning outcomes No.4: INTERACTION WITH OTHER NUCLEAR ACTORS/DEPARTMENT TU (3.9.1;2.3.1; 3.7.1)		
M4.1: INTERACTION WITH OTHER NUCLEAR ACTORS/DEPARTMENTS		Remarks/limits/advices
<p>S.4.1. Integrate radwaste management strategy into the decommissioning plan S.4.2. Integrate radwaste management strategy into the overall</p>	<p>K.4.1. General plant description and basic technical characteristics of nuclear facilities K.4.2. Nuclear fuel cycle K.4.3. Safety systems operation</p>	

<p>management strategy of the plant S.4.3. Lead performance of complex analyses involving different facility's systems, structures, components and processes S.4.4. Perform proper communication in different areas of waste management S.4.5. Report activities and disseminate information S.4.6. Coordinate actors in waste management activities S.4.7. Share knowledge, information and experiences S.4.8. Analyse and upgrade decommissioning plans</p>	<p>K.4.4. Radioactive waste treatment systems operation K.4.5. Applicable codes, regulations and standards for decommissioning phase K.4.6. Knowledge of plant (site, units') operational history K.4.7. Safety Analysis Report (SAR) K.4.8. Dismantling methods and techniques K.4.9. Key issues of facilities' maintenance, surveillance and inspection. Facility modifications K.4.10. Radiological characterization of the facility K.4.11. Decontamination techniques for equipment and SSCs K.4.12. Waste categorisation K.4.13. Knowledge management</p>	
<p>Unit of learning outcomes No.5: EVALUATION AND OPTIMISATION OF INDIVIDUAL AND COLLECTIVE DOSES /BU (3.9.1; 2.3.1)</p>		
<p>M5.1: EVALUATION AND OPTIMISATION OF INDIVIDUAL AND COLLECTIVE DOSES</p>		<p>Remarks/limits/advices</p>
<p>S.5.1. Monitor decommissioned areas S.5.2. Evaluate dose rates and radioactive contamination S.5.3. Evaluate the radiation situation S.5.4. Evaluate problems regarding radiation protection and dosimetry S.5.5. Ensure the maintenance of radiation protection instruments and materials S.5.6. Optimise radiation protection methods and techniques for decommissioning S.5.7. Provide information about radiological situation S.5.8. Analyse and upgrade decommissioning plans S.5.9. Comply with legal requirements of radiation protection and dosimetry in national regulations and rules S.5.10. Recommend personal and collective protective equipment</p>	<p>K.5.1. Measurement of radioactive characteristics K.5.2. Detectors for radiation monitoring K.5.3. Dosimetry (limits and norms) K.5.4. Radiation protection measures and technics K.5.5. Statistical assessment of data K.5.6. Modelling and simulation codes applied in dosimetry K.5.7. ALARA principles K.5.8. Radionuclide vectors identification K.5.9. Stochastic approach in radiation impact K.5.10. Biological impacts of radiation doses</p>	
<p>Unit of learning outcomes No.6: MANAGEMENT OF HEALTH, RADIOLOGICAL AND ENVIRONMENTAL RISKS/ BU (3.9.1; 2.3.1)</p>		
<p>M6.1: Management of health, radiological and environmental risks</p>		<p>Remarks/limits/advices</p>
<p>S.6.1. Evaluate health and radiological risks S.6.2. Evaluate environmental risks S.6.3. Apply risks assessment methods in decommissioning S.6.4. Provide internal information about risks assessment S.6.5. Undertake corrective measures S.6.6. Harmonise health and regulatory requirements</p>	<p>K.6.1. Risks assessment and management K.6.2. Health and environmental standards, codes and guidelines K.6.3. Biological acceptance of irradiation K.6.4. Health protection K.6.5. Environmental protection K.6.6. Radiation protection measures and technics</p>	

<p>S.6.7. Propose and implement corrective and preventive actions related to radiological and/or conventional risks S.6.8. Inform and/or train work teams to global approach "Health Safety Environment" S.6.9. Participate in workplace studies related to health, safety and medical department S.6.10. Create and use of health, radiological, and environmental databases</p>	<p>K.6.7. Human behaviour related to health, radiological, and environmental risks K.6.8. Individual and collective protective equipment K.6.9. Management of health, radiological, and environmental data K.6.10. Train the trainers methodology</p>	
<p>Unit of learning outcomes No.7: RADIOACTIVE WASTE MANAGEMENT/ BU (3.9.1; 2.3.1)</p>		
<p>M7.1: Handling and transport radioactive waste</p>		<p>Remarks/limits/advices</p>
<p>S.7.1. Evaluate and control the level of contamination and induced activities of radioactive waste S.7.2. Select optimal solution and manage radioactive waste categorisation S.7.3. Manage radioactive waste handling and transport S.7.5 Apply proper criteria for treated waste classif. and handling S.7.6. Evaluate and manage collected data about waste characteristics S.7.9. Comply activities with national program in decommissioning S.7.10. Developing waste management program, specifications and procedures S.7.11. Apply appropriate solutions in packaging</p>	<p>K.7.1. Waste characterisation and categorisation K.7.2. Dosimetry K.7.3. Nuclear safety and radiation protection K.7.5. Health protection K.6.6. Environmental protection K.7.7. Nuclear safety culture and human factor K.7.8. Protective clothing and protective equipment K.7.9. Transport, handling and storage of radioactive waste K.7.12. Waste conditioning including packaging</p>	
<p>M7.2: Storage radioactive waste</p>		
<p>S.7.4. Apply proper techniques for optimal storage of waste S.7.7. Ensure radiation protection support for waste manipulation and storage S.7.8. Evaluate radiation situation in decontamination, handling, transport and storage process</p>	<p>K.7.4. Relevant national and international legislation and guidelines K.7.10. Treatment and long term storage K.6711. National policy and program in decommissioning</p>	<p>M7.1 is recommended as a prerequisite</p>

Unit of learning outcomes No.5: DECOMMISSIONING MANAGEMENT		
M5.1: Decommissioning management		
<p>S.5.1. Participate and/or organize decommissioning activities</p> <p>S.5.2. Organise decommissioning work</p> <p>S.5.3. Prioritise objectives</p> <p>S.5.4. Use the optimal tools and technology in decommissioning</p> <p>S.5.5. Evaluate efficiency of decontamination</p> <p>S.5.6. Monitor waste accumulation and transport</p>	<p>K.5.1. Waste origin and handlings</p> <p>K.5.2. Contamination, decontamination</p> <p>K.5.3. Decontamination technologies and tools</p> <p>K.5.4. Radioecology and environmental remediation</p> <p>K.5.5. Partitioning and compacting</p> <p>K.5.6. Decommissioning procedures</p> <p>K.5.7. Limits for free release</p> <p>K.5.8. Prediction and simulating of activation</p>	<p>The module M5.1 - Decommissioning management from qualification 3.7.1. will be merge with the module Management of Decommissioning projects which is transversal module/TM over three qualifications (3.1.1; 3.3.1 and 3.8.1)</p>
<p>Assessment criteria: Ability to evaluate waste activity</p>		

ASSESSMENT MODULE TEMPLATE

Performance of decommissioning strategy and program
Ability to organize decommissioning works and activities
Feedback on operational events
Pertinence of decommissioning selected tools and techniques

Recommended assessment methods:

Written test: problem solving, study case ...
Situational judgement test
Oral test
Practical test

Annex I: Agenda



2nd Workshop on- Qualifications for Nuclear Decommissioning
Bergen (The Netherlands) 24 – 28 October 2016

AGENDA

(v.7-draft) Petten, Oct. 2016
G.10/MC

Day 1/Monday 24 October - afternoon

13:00 *Lunch*

OPENING SESSION

- 14:00** Setting the scene
Objectives and work plan
Welcome and introduction of the participants
M. Ceclan
- 14:30** Practical arrangements and logistics
C. Chenel- Ramos
All
- 14:35** Presentation:
JRC contribution to ECVET infrastructure development
Questions and debate
F. Wastin
- 14:45** Presentation:
ELINDER– Plans for a future application of ECVET
P.Kockerols
- 15:05** *Coffee break*
- 15:20** Presentation:
Changes in nuclear qualifications design
Questions and debate
T. Lefeuvre
A. Costa Artur
All
- 16:15** Presentation:
Questions for training design using ECVET principles
Questions and debate
T. Lefeuvre
A. Costa Artur
All
- 17:30** *End of the first day*

Henceforth the meeting shall split in two working groups

Day 2/Tuesday 25 October- morning

09:00 Group review of the qualifications 3.7.1 and 3.1.1

WG 1	Activity	Moderator
	Qualification review: 3.7.1. Radioactive Waste Management	T. Lefevvre; M. Ceclan
WG 2	Activity	Moderator
	Qualification review: 3.1.1. Decommissioning Management	A. Costa Artur; C. Chenel

10:30 *Coffee break*

11:00 Group preparation of the ECVET input for the Training programs linked to the qualifications 3.7.1 and 3.1.1

WG 1	Activity	Moderator
	Preparation of the ECVET input for the Training program linked to the qualification 3.7.1	T. Lefevvre; M. Ceclan
WG 2	Activity	Moderator
	Preparation of the ECVET input for the TP linked to the qualification 3.1.1	A. Costa Artur; C. Chenel

12:30 *Lunch*

Day 2/Tuesday 25 October - afternoon

13:30 Group cross analysis of qualifications 3.7.1 & 3.1.1 and corresponding ECVET input for Training programs-market oriented

WG 1	Activity	Moderator
	Review of the qualification 3.1.1 and ECVET input for TP-market oriented. Recommendations for the WG 2.	T. Lefevvre; M. Ceclan
WG 2	Activity	Moderator
	Review of the qualification 3.7.1 and ECVET input for TP-market oriented. Recommendations for the WG 1	A. Costa Artur; C. Chenel

15:30 *Coffee break*

16:00 Plenary session

WG 1+2	Activity	Moderator
WG 1	Deliverable 2: Updated qualification 3.7.1 and ECVET input for TP - market oriented.	V. Slugen
WG 2	Deliverable 1: Updated qualification 3.1.1 and ECVET input for TP - market oriented.	L. Pironkov
	Conclusions on the updated qualifications and ECVET input for TP- market oriented.	T. Lefevvre; A. Costa Artur

17:30 *End of the second day*

Day 3/Wednesday 26 October - morning

09:00 Group review of the qualifications 3.9.1 and 3.3.1

WG 1	Activity	Moderator
	Qualification review: 3.9.1. Radiation Protection Expert	T. Lefeuvre; M. Ceclan
WG 2	Activity	Moderator
	Qualification review: 3.3.1. Preparatory work Management	A. Costa Artur; C. Chenel

11:15 *Coffee break*

11:45 Group preparation of the ECVET input for the Training programs linked to the qualifications 3.9.1 and 3.3.1

WG 1	Activity	Moderator
	Preparation of the ECVET input for the TP linked to the qualification 3.9.1	T. Lefeuvre; M. Ceclan
WG 2	Activity	Moderator
	Preparation of the ECVET input for the TP linked to the qualification 3.3.1	A. Costa Artur; C. Chenel

13:00 *Lunch*

Day 3/Wednesday 26 October - afternoon

14:00 Group cross analysis of qualifications 3.3.1 & 3.9.1 and corresponding ECVET input for TP -market oriented

WG 1	Activity	Moderator
	Review of the qualification 3.3.1 and ECVET input for TP -market oriented. Recommendations for the WG 2.	T. Lefeuvre; M. Ceclan
WG 2	Activity	Moderator
	Review of the qualification 3.9.1 and ECVET input for TP -market oriented. Recommendations for the WG 1.	A. Costa Artur; C. Chenel

15:30 *Coffee break*

16:00 Plenary session

WG 1+2	Activity	Moderator
WG 1	Deliverable 3: Updated qualification 3.9.1 and ECVET input for TP -qualification oriented.	V. Slugen
WG 2	Deliverable 4: Updated qualification 3.3.1 and ECVET input for TP -market oriented..	L. Pironkov
	Conclusions on the updated qualifications and ECVET input for TP -market oriented.	T. Lefeuvre; A. Costa Artur

17:30 *End of the third day*

Day 4/Thursday 27 October - morning

09:00 Group review of the qualifications 2.3.1 and 3.8.1

WG 1	Activity	Moderator
	Qualification review: 2.3.1. Management of Radioactive Waste &RP	T. Lefeuvre; M. Ceclan
WG 2	Activity	Moderator
	Qualification review: 3.8.1 Management of maintenance in decommissioning	A. Costa Artur; C. Chenel

11:00 *Coffee break*

11:30 Group preparation of ECVET input for the Training programs linked to the qualifications 2.3.1 and 3.8.1

WG 1	Activity	Moderator
	Preparation of the ECVET input for the TP linked to the qualification 2.3.1.	T. Lefeuvre; M. Ceclan
WG 2	Activity	Moderator
	Preparation of the ECVET input for the TP linked to the qualification 3.8.1.	A. Costa Artur; C. Chenel

13:00 *Lunch and visit in Kranenburgh museum*

14:30 *End of the fourth day*

Day 5/Friday 28 October - morning

09:00 Group cross analysis of qualifications 2.3.1 & 3.8.1 and corresponding ECVET input for TP –market oriented

WG 1	Activity	Moderator
	Review of the qualification 3.8.1 and ECVET input for TP – market oriented. Recommendations for the WG 2	T. Lefeuvre; M. Ceclan
WG 2	Activity	Moderator
	Review of the qualification 2.3.1 and ECVET input for TP – market oriented. Recommendations for the WG 1	A. Costa Artur; C. Chenel

11:00 *Coffee break*

11:30 Plenary session

WG 1+2	Activity	Moderator
WG 1	Deliverable 5: Updated qualification 2.3.1 and ECVET input for TP – market oriented.	V. Slugen
WG 2	Deliverable 6: Updated qualification 3.8.1 and ECVET input for TP – market oriented.	L. Pironkov
	Conclusions on the 2 nd WS Other closure presentations Questions and debate	T. Lefeuvre; A. Costa Artur M. Ceclan All

13:00 *Lunch*

14:00 *End of the Workshop.*

